

The **Iron Age** A Chilton Publication

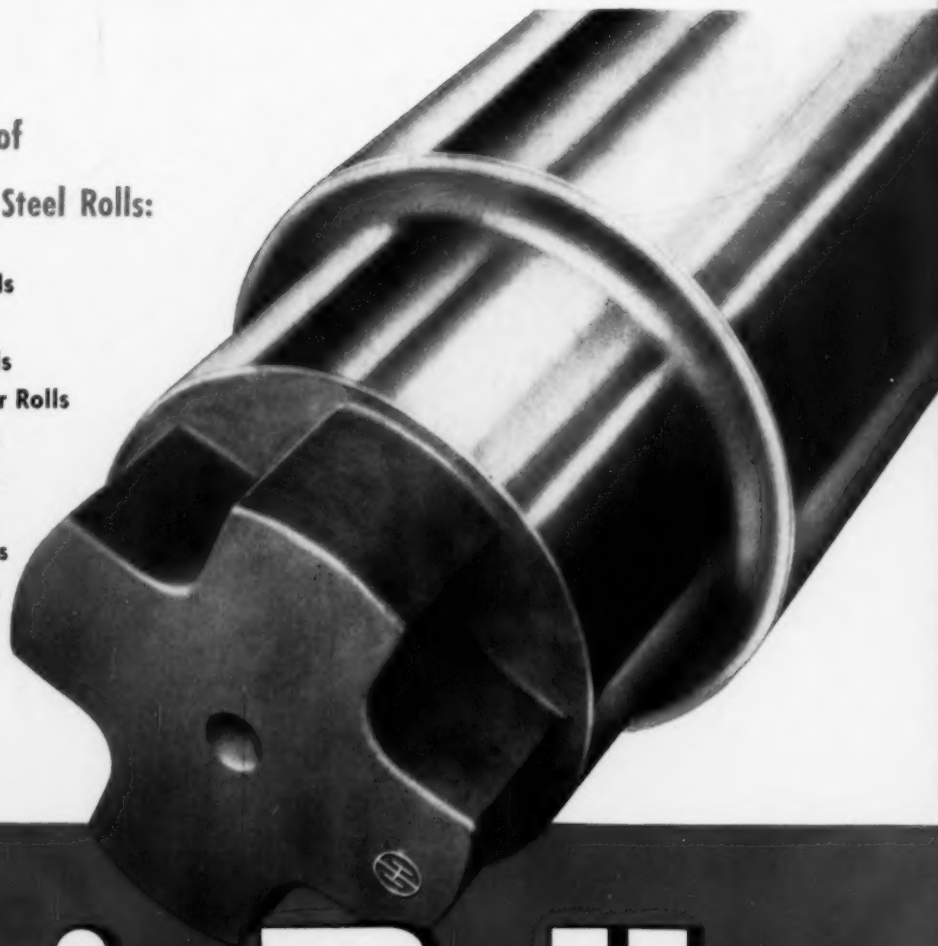
What are the
future markets
for stainless
steel?
See page 43

THE NATIONAL METALWORKING WEEKLY • JUNE 16, 1955

Choose from 11 types of

Ohio Iron and Steel Rolls:

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- Ohioloy "K" Rolls
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THE OHIO STEEL FOUNDRY CO.

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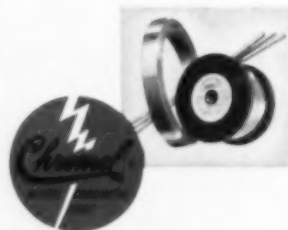
Chromel-Alumel thermocouple alloys are produced exclusively by

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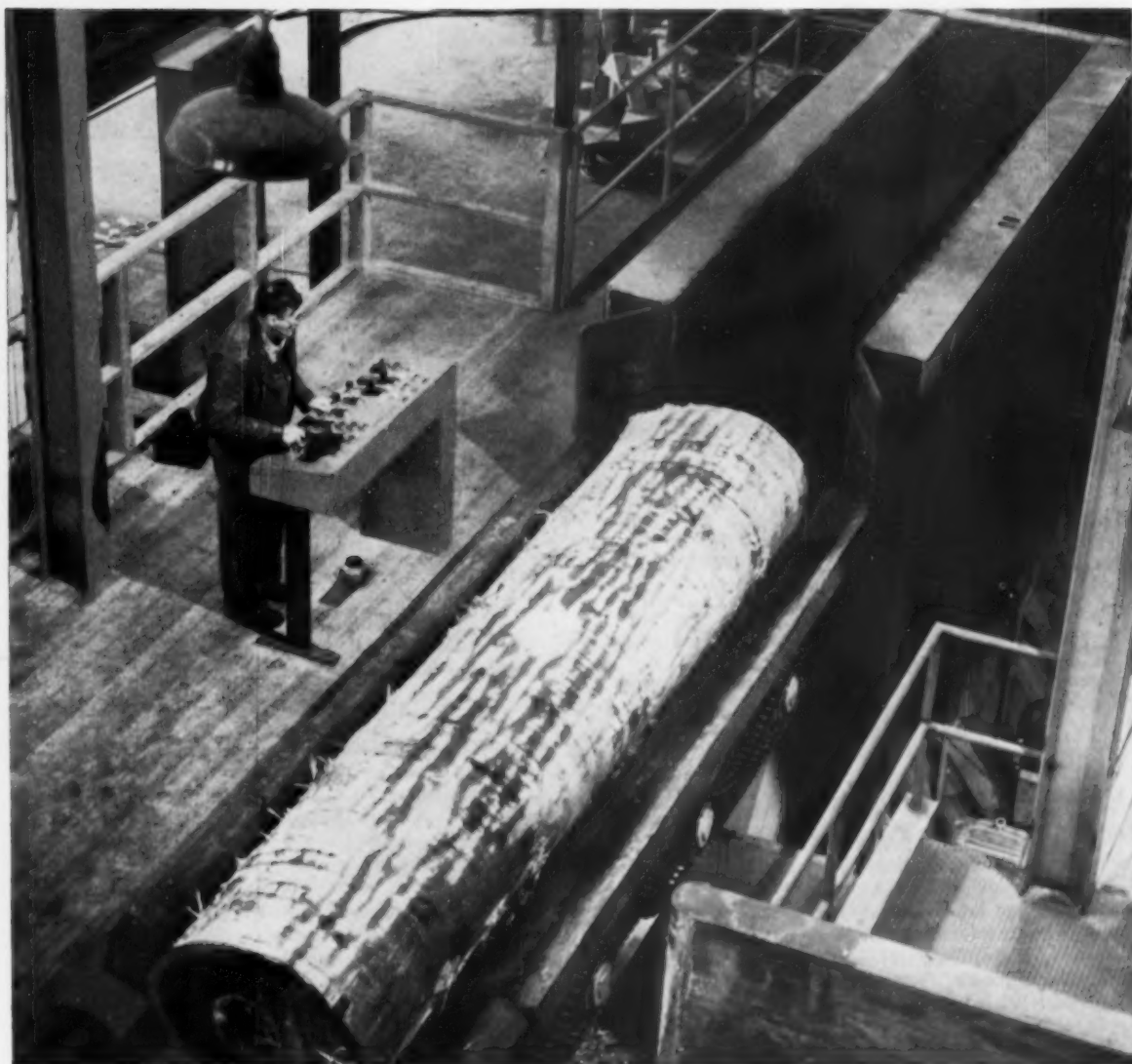
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Ask for them by name!

Your instrument manufacturer or pyrometer service company can supply your immediate requirements... so specify them by name. "Chromel-Alumel" thermocouples... trade names you can trust!



Mayari R makes it lighter...stronger...longer lasting



Making Chips Out of Tall Timber

Down from a Northwest tree farm the tall timber comes, to the pulp mill of Rayonier Inc., at Port Angeles, Wash. Then, barked and soaking wet, each 20-ft log is mechanically tipped into this steel chute which holds it upright while the chippers cut it up for the pulp digesters.

Measuring 9 ft around and weighing several tons, these thumping big logs pound the chute unmercifully. But Rayonier engineers foresaw this ordeal, and designed the chute with

husky plates of Mayari R high-strength, low-alloy steel. Mayari R's high yield point and resistance to corrosion, impact and abrasion arm the chute for a long life in this grueling service.

Leckenby Structural Steel Company, of Seattle, fabricated the chute for Rayonier. Like many other fabricators, they found Mayari R as weldable and workable as other steels, without sharp changes from usual procedures. Our Catalog 353 gives the Mayari R story in full,

including numerous case histories and application photographs. You can get a copy promptly through the Bethlehem sales office nearest you.

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Starred items are digested at the right

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NEWS DEVELOPMENTS

DETROIT GETS READY TO LIVE WITH GAW — P. 46

With General Motors following Ford's lead and signing a contract calling for modified GAW, the auto industry is resigned to the fact that a guaranteed wage or unemployment benefits are here to stay. There are some legal kinks to be ironed out and not all labor people are happy of the development but the consensus is that industry must make the best of GAW.

AUTO SETTLEMENT MAKES STEEL TOUGHER — P. 47

Steel union has stepped up its demands as a result of Detroit GAW settlements. There won't be steel strike, but the union will come very close to a walkout. Steel companies will have to act tough to keep price increases at a minimum. Settlement may call for 15¢ per hour wage increase.

PLANT EQUIPMENT OUTLAYS ARE SOARING — P. 50

Expenditures for new plant and equipment have risen sharply since first quarter. Third quarter outlays will hit \$28.8 billion, matching previous record. All industries share in stepped up spending rate.

TRUSTBUST MOVE HEATS UP AT HEARINGS — P. 52

Two separate hearings have drawn a Justice Dept. request for merger controls, charges of monopoly by congressional leaders and denials by industry. Trustbusters feel the time is ripe for a drive against big companies. General Motors operations are getting a close look from the Justice Dept. but no action is planned right now.

LABOR HAS LOST ITS MOBILITY — P. 57

New auto contracts continued the trend toward labor immobility. It started with non-contributory pensions and vested rights in seniority. With an equity in the company, a worker could not afford to jump his job or move in periods of slack time for fear of losing this equity. Company responsibility for layoffs almost completes cycle.

PACKARD HOPES RIDE TORSION BAR — P. 60

Former luxury car leader is showing signs of regaining much of its former prestige. President James J. Nance's new program is based on innovations with torsion bar suspension first to get the buildup. Ride is smooth at all speeds and over all types of roads. Industry production records may fall as pace shows only a few signs of slackening.

IN METALWORKING

ENGINEERING & PRODUCTION

NEW, FAST PRESS DIES TRAVEL WITH STRIP—P. 83

Blanking and shallow forming operations can be performed at 400 to 600 strokes per minute on a new, 60-ton hydraulic press. Press design incorporates dies which move with the strip and continuous coil feeding. It has no clutch or brake. Other advantages include less setup time, variable feed lengths and low maintenance.

FAST ANALYSES SPEED MAGNESIUM OUTPUT—P. 87

Continuous production of magnesium alloys requires close coordination, and fast, accurate analyses to help keep metal to alloy specification. Direct reading spectrometers have given Dow tighter control of alloy content in a fraction of the time previously required. Overall result has been to keep production stepping along briskly.

WELDING PROCESS DEPOSITS METAL FASTER—P. 90

Submerged-arc welding technique can deposit more metal in less time. Greater efficiency is achieved by reducing energy losses. Production can be tripled using a new method of welding that can be adapted to existing systems. Larger transformers may be required.

SHELL CORES, MOLDS BLOWN AT HIGH RATE—P. 92

Shell molds and cores can be blown at up to 240 pieces per hour in a new machine. Flexibility in shell mold and core production is achieved by combining electrically heated split patterns or molds, sand-resin blowing equipment, and a heated mandrel. Hollow cores with excellent venting and collapsibility characteristics can be readily produced without drier plates and ovens. Contoured molds may be easily stacked.

MACHINES HANDLE UNWIELDY METAL SHEETS—P. 96

Feeders, turnover machines, pilers and other types of modern equipment can be made to do practically any sheet metal handling job. They'll process sheets singly or in stacks. Where production volume is large, automatic machines will do the work faster and at less cost than is possible with manual handling.

MARKETS & PRICES

WHAT'S THE OUTLOOK FOR STAINLESS — P. 43

Use of stainless will grow tremendously in the next 10 years, but its biggest growth potential is in the home. Skyscrapers are spectacular but doorknobs are bigger. May set shipment record this year.

BIG STAMPINGS MARKET OPENS IN MIDWEST — P. 48

A recent survey shows consumption of metal stampings ran to \$100 million in Kansas, Missouri, Iowa, Nebraska and Oklahoma. Output is far behind consumption. Freight and wage considerations point to expansion of local stamping facilities, now centered in Kansas City.

COAL PIPELINE AIMS AT MARKETS — P. 51

Plans for a 108 mile pipeline for the transportation of coal between coal properties in Georgetown, O., and consuming area in Eastlake, O., have been revealed by Pittsburgh Consolidation Coal Co. and Cleveland Electric Illuminated Co. Idea of pipeline is to improve competitive position by cutting freight cost.

PRESSURE ON STEEL OUTPUT WILL CONTINUE — P. 139

Settlement of automotive labor negotiations means that auto production will zoom to new highs. To steel consumers this is the tip-off that the pressure on steel supply will continue through the summer months. There will be little or no letdown during what normally is an easier time for the steel mills. Some producers are running as much as 45 days behind schedule, and there has been a further buildup in order backlogs.

STEEL PRODUCTS MARKET OUTLOOK STRONG — P. 140

Reports from Iron Age district editors indicate little change in demand for individual steel products. The outlook, based on orders already booked and those hitting the desks of steel sales managers, is for a continuance of the tight situation that has prevailed over the last five to six months.

NEXT WEEK:

IMPROVE THE QUALITY OF DEEP DRAWING STEELS

Strain aging is a major problem in deep drawing operations. It results in "stretcher strains" which mar appearance. Some aged materials even tear in the press. A vanadium addition can prevent "stretcher strain" in deep drawing sheet. Careful processing of stabilized material does away with temper rolling.

HOW ARE STEEL EXPANSION PLANS STANDING UP?

Present steel expansion schedules were based on what producers thought the country would need by 1960. New population and boom factors call for added capacity to the tune of about 12 million tons in the next 3 years. Next week Iron Age editor Tom Campbell tells what new needs will mean in new facilities.

Completely automatic, unattended unloading end of the Stevens Automatic Barrel showing control panel and rectifier site located above machine.



**Unistrut says —
"COSTS 50% LOWER—
FINISH BETTER with . . .**

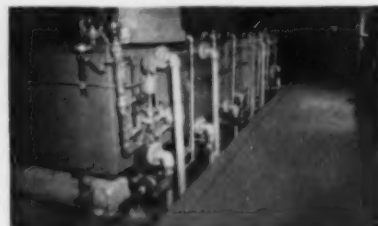
STEVENS AUTOMATIC BARREL MACHINE"

Every day in the Unistrut Corporation plant, Wayne, Michigan, thousands of small parts are zinc plated and shipped to Unistrut warehouses throughout the United States. All of these parts are zinc plated automatically by a Stevens Automatic Barrel Machine.

Unistrut high standards require a uniformity of plate on the parts used in their metal framing systems. But since installing the Stevens Automatic Barrel they have reported other advantages as well — "less handling, smaller inventories and quicker shipments." When you consider the 50% cost savings of actual plated parts too, it all adds up to a terrifically profitable investment.

Why don't you tell us your metal finishing problems and let us make recommendations. There's no obligation. Write to —

**BRANCHES: BUFFALO • CLEVELAND • INDIANAPOLIS
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Side view of machine showing excellent drainage system.



Plating section of machine with ventilating duct work.



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GRINDING
OPERATIONS

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FINISHING

BARREL
TUMBLING

METAL
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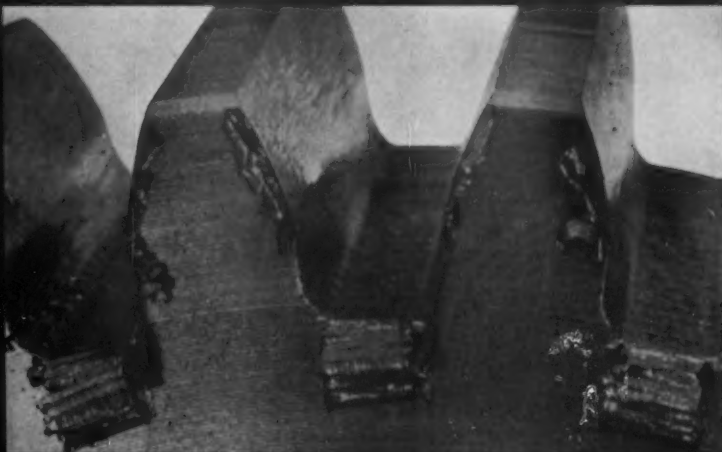
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Metal Finishing equipment and supplies from castings or stampings to finished product.

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STEVENS**
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*... rough
to finish
in one
operation*



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AFTER BRUSHING. Burrs are gone — smooth, uniform blend on junctures of gear face and involute increase tooth strength.

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Gears finished on Osborn Brushamatics are stronger, more dependable. By removing sharp corners, stress concentrations are avoided. Thus, there is less chance for failure in severe service.

Your operator simply loads and unloads the work. Brushamatic rotates the piece against revolving brushes on preset time cycles.

An Osborn Brushing Analyst can show you how to put Brushamatic to work for you. One machine can handle a large variety of work... is easy to set up from job to job. Call or write *The Osborn Manufacturing Company, Dept. F-33, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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"I need 6000 lbs. of structurals this afternoon--how about it?"

(A true story) It was 4:10 in the afternoon when the purchasing agent of a construction company called his desk man at Ryerson. "I need some structural channels in a hurry—12 inch, 25 pound . . . let's see, 12 pieces—that's 6000 lbs. Can I have it today? I'm really in a jam."

Ryerson's large stocks of ASTM-Spec A-7 structurals included just what was wanted. The steel was immediately cut and loaded, and at 4:35—just 25 minutes after the call—our truck rolled into the construction company's yard. They were then able to fabricate the

channels in their own shop and have them in place by 11 P. M.

"I thought of Ryerson because I've always had good service from you," the customer commented later. "I know I was asking a lot, but you really came through for me!"

Whether it's your day-to-day requirements, or help in an emergency—count on Ryerson. Here are the world's largest steel stocks—un-surpassed facilities—and an organization eager and able to deliver. When you need steel—of whatever kind . . . call Ryerson.

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Principal products in stock: bars, structurals, plates, sheets, tubing, alloy and stainless steel, re-bars, etc., also machinery and tools.

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Indexed in the Industrial Arts Index
and the Engineering Index.



Editorial:

How Does GAW Affect You?

♦ WHEN FORD Motor Company accepted responsibility for unem-
ployment among its workers and offered supplemental unemployment
payments, new labor history was written. Its effect will last for
decades. This agreement to give a modified GAW produces tough
problems for other industries—and for smaller companies.

A few years ago when major industries agreed to pay noncon-
tributory pensions as a supplement to Federal social security pay-
ments they left a big hole open for the union. The United Automobile
Workers have walked through that hole. A supplemental unemploy-
ment payment plan at no cost to the employee is now an established
fact. Every other union will try now to get the same thing—or better.

Steel, rubber and other mass producing industries are in the direct
line of fire for a GAW type unemployment plan. Whether one agrees
with the principle or not it is hard to see how the spread of such a
plan to industry in general can be brushed aside.

One thing is sure. The price tag on the unemployment plan is
going to be picked up by the people who buy the cars, by the stock-
holders who hope to get dividends and by the workers themselves.
It may possibly be that the change in morale because of the security
feature will be strong enough to cause an unlooked for increase in
productivity.

It may also be that workers will feel so secure with pensions, sick
benefits, unemployment pay and other fringe benefits that they will
spend up to the full amount of their earnings from here on out. That
might cause a continual upward movement in total sales and produc-
tion as the country expands towards the millennium.

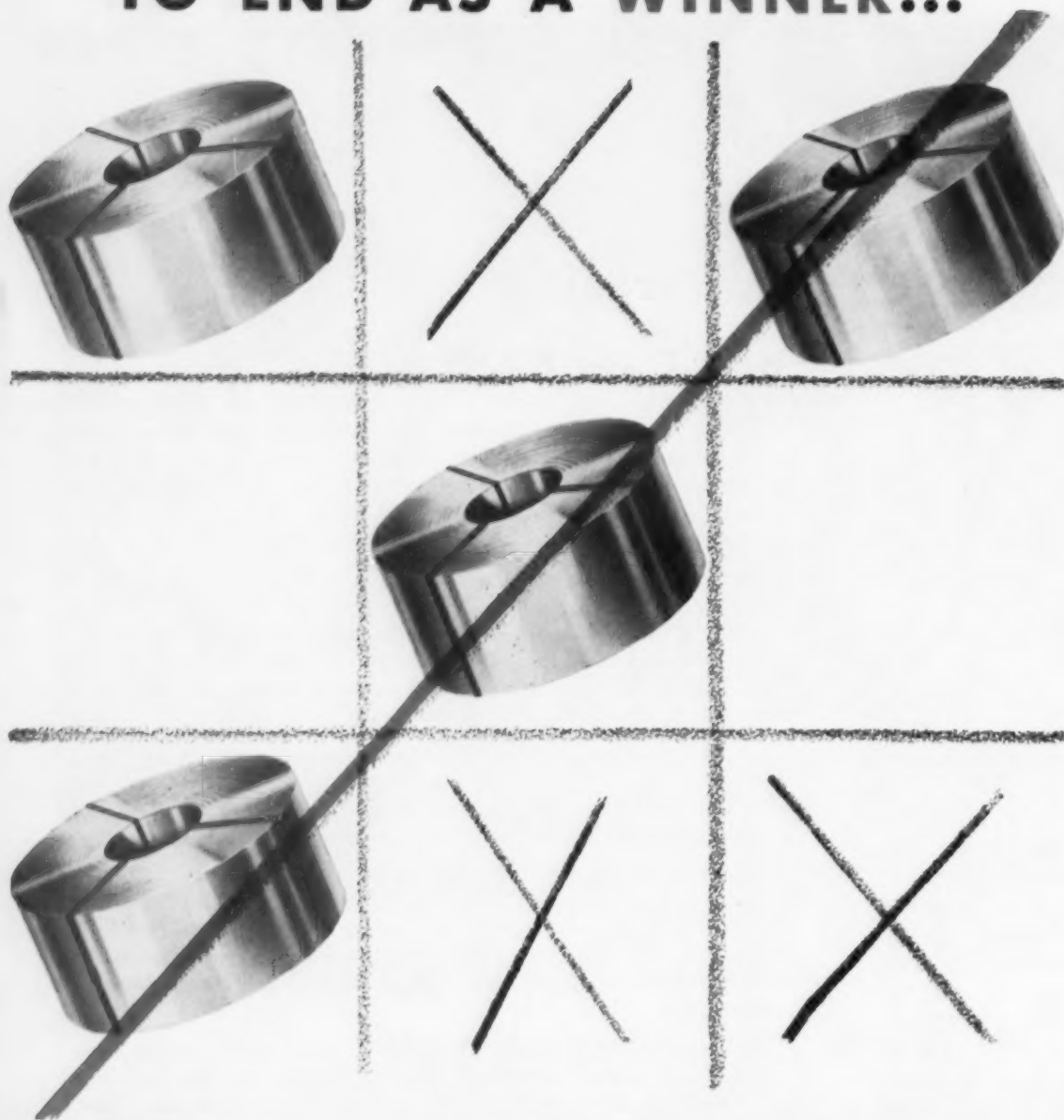
What the final cost will be no one knows. But we can look for
higher prices, a big expansion in the "cradle to the grave" security
program, the freezing of men on jobs within a company, a drop in
people's desire to take a risk and eventually a further narrowing in
productivity between the average worker and the use-to-be go-getter.

American industry is now going through one of its greatest labor
upheavals in modern history. The pains will be great. The casual-
ties may not be small among those who cannot afford luxurious fringe
benefits. But stability is now the watchword.

Tom Campbell

EDITOR

TO END AS A WINNER...



BEGIN

with SHARON STAINLESS STEELS

SHARONSTEEL



Type 430 Stainless and
Galvanite® Coated book-
lets are available from
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Sharon produces all popular grades of Stainless Steel in large diameter coils for economical fabrication, and with the finest finish available in the industry.

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dear editor:

letters from readers

Fasteners

Sir:

While yours has been our ffj for many years, we're just careless enough never to have said "Thanks" for the many worthwhile editorials and articles. Expect a lot of other folks just don't get around to that good word either.

Frankly, our writing at this time is due to an engineering request. Your May 19 issue, p. 146, has an article on fasteners. Will you furnish the address of Starlock, Inc., or can you refer this request for data on fiber inserts for fasteners? *W. J. Young, Consolidated Packaging Machinery Corp., Buffalo, N. Y.*

Sir:

In the May 19 issue of your magazine, p. 146, you mention a self-locking cap screw, with convex fiber insert, which is manufactured by Starlock, Inc., N. Y. Will you please furnish us with the address of this firm? We would like to contact them for more information on this item. *D. R. Wilson, Development Engineer, Mechanical Research & Development, Halliburton Oil Well Cementing Co., Duncan, Okla.*

Starlock, Inc. is located at 235 Canal St., New York 13, N. Y.—Ed.

Hob Sharpening

Sir:

In the Feb. 10 issue of THE IRON AGE there is an article that reads as follows: "Hob sharpening costs are being reduced by a variable speed hydraulic powered high-speed hob sharpener equipped with wet grinding attachments. . ."

Can you give us the address of the manufacturer of the sharpener?

M. Nachtweih, The National Research Bureau, Inc., Chicago.

Details on the hob sharpener may be obtained from Star Cutter Co., 34500 Grand River, Farmington, Mich.—Ed.

Brain Teasers

Sir:

Our client, Tinnerman Products, Inc., would like very much to use material from your publication in their proposed new external publication, *Speed Notes*. I am referring to the brain teasers that appear regularly in the Fatigue Cracks column by W. M. Coffey. May we have your permission to use this material? *Warren Whiting, Mel-drum & Fewsmith, Inc., Cleveland.*

We're always glad to widen the puzzler's circle.—Ed.

Modern Steel Plant

Sir:

We would greatly appreciate having you forward to us, if available, three sets of tear sheets from the Nov. 4, 1954, issue of THE IRON AGE entitled "Modern Steel Plant Teams Continuous Casting with Planetary Mill." *S. M. Stoler, President, R-S Furnace Co., Inc., Philadelphia.*

Annual Wage

Sir:

Please send me a tear sheet of your "Special Report—Guaranteed Annual Wage" which appeared on p. 55 of the April 28 issue of THE IRON AGE. I am a student at the Wharton School of the University of Pennsylvania, majoring in industrial management. *R. Weber, Philadelphia, Pa.*

Hyde Park



Rolling Mill Equipment

For more than 50 years Hyde Park Steel Mill equipment has been helping American industry lead the world—equipment such as—



Bar Mills
Merchant Mills
Sheet and Strip Mills
Pinion Stands
Roller Tables
Reduction Drives
Stretcher Levellers
Guillotine Shears
Sheet Mill Shears
Roll Lathes
Special Machinery
Machine Work

For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park

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ROLLS
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GREY IRON CASTINGS

BAKER "FG" — a new concept in gas truck construction — "BALANCED DESIGN"

Here's how the Baker FG gas fork truck —
"first in its class" — was conceived:

First: Exact requirements for a specific truck in the FG line were thoroughly analyzed. Then our engineers, working with a top manufacturer of heavy-duty industrial gas engines, chose the power plant specifically to meet these requirements. Even internal parts of the engine were balanced. For example, our specifications call for pistons balanced to ± 2 grams instead of the conventional ± 2 ounces.

Next: Transmission was selected to match the power plant and geared to provide required speeds and acceleration. In conjunction with the largest builder of axles in the country, the drive axle was developed to match power plant and transmission.

Lifting mechanism was selected to meet requirements and to be coordinated with power train and other components. *Mast* was engineered for the maximum safe lift, within the stability ratio of the frame which was designed for exceptionally low center of gravity. The standard Baker wide-angle steer, rubber mounted, trailing axle was modified to match the other elements.

Result: 100% Balanced Design
—another Baker "First".

Baker "FG" gas fork trucks are available with 3,000, 4,000, 5,000 and 6,000 pound capacities. Specific bulletins can be obtained by writing The Baker-Raulang Company, 1227 West 80th Street, Cleveland 2, Ohio.

Baker
HANDLING EQUIPMENT



8 REASONS WHY THE BAKER FG FORK TRUCK IS FIRST IN ITS CLASS...

1. LOWER INITIAL COST

FG-40 (4000 lb.) \$4295.
Other models at proportionate savings.

2. LONGER WARRANTY PERIOD

Baker quality permits full 6 months' warranty.

3. HIGHER LIFT

Mast design allows higher standard lift than ordinary trucks.

4. LOWER MAINTENANCE COSTS

Designed for easier and less frequent servicing.

5. MORE MANEUVERABLE

Short turning radius cuts aisle width, adds floor space.

6. EASIER TO OPERATE

Greater visibility... easy-to-work controls.

7. GREATER STABILITY

Lower center of gravity... higher "stability factor" ratio.

8. BETTER BRAKING

Full floating, self-equalizing, self-energizing brakes.

5G1

fatigue cracks

by William M. Coffey

Letters

Some more about our 100th birthday . . .

Dear Sirs:

As you are probably well aware, the magazine **IRON AGE** which you publish, will be one hundred years old in June. It was founded by my great grandfather, John Williams, and his son David Williams. My father, David L. Williams, started to work for **THE IRON AGE** in about 1888 and was soon made a partner with his father. The magazine was sold in 1909 to other interests.

The reason I'm giving you all this history is because I thought it might interest you to know that David L. Williams is still living. He is 84 years old and in excellent health.

If you put out an issue of **THE IRON AGE** in commemoration of 100 years of publication, would you be kind enough to send a copy to my father? I know he would get a big kick out of it. Send it to Mr. David L. Williams, 95 North Broadway, White Plains, New York.

Sincerely,
Walter J. Williams
Upperville, Virginia

We will send Mr. Williams a copy of "100 Years of Metalworking" with the greatest of pleasure.

Dear Mr. Campbell:

From time to time Iron Age Safety Shoe has had some correspondence with your magazine and as you know we have always enjoyed a wonderful mutual relationship along with Iron Age Farm Implementments.

I noticed an article last Sunday in the New York

Times that this June was to be your 100th Anniversary. We here at Iron Age Safety Shoe would like to offer our congratulations to you. Even though our company was started back in 1817 (Holy Smokes—Ed), it certainly is a great tribute to your publication to have grown to such a large and excellent magazine.

Your very truly,
IRON AGE DIVISION
J. H. Childs, Jr., Pres.



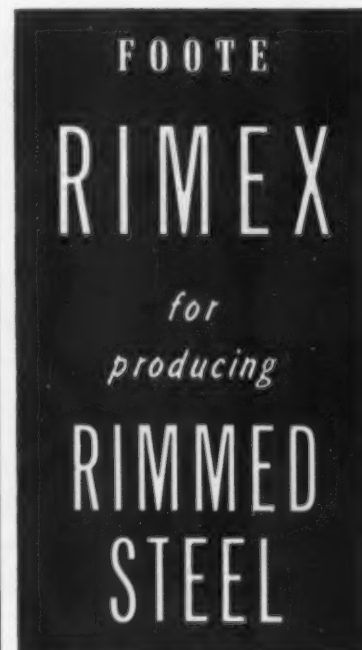
Puzzlers

Mr. Hoover's answer to his 12 ft ladder puzzler (May 19) is 9.969 ft. Those who agree with Mr. Hoover are C. W. (Ole Reliable) McKinley, AC Spark Plug; Wallace A. Sawdy, MacInnes Steel Sales Co.; Myron Bowerman, The Alliance Machine Co.; J. F. Robinson, U. S. Steel; C. Leonard Forbes, Wilfley Centrifugal Pumps; and R. A. Badt, Junior Steel Co.

New Puzzler

Many thanks to J. W. Foster of Ingersoll-Rand for this one: If a quantity of two digits is tripled and the digits added to the product, the result is the original quantity with the digits reversed. What is the original quantity?

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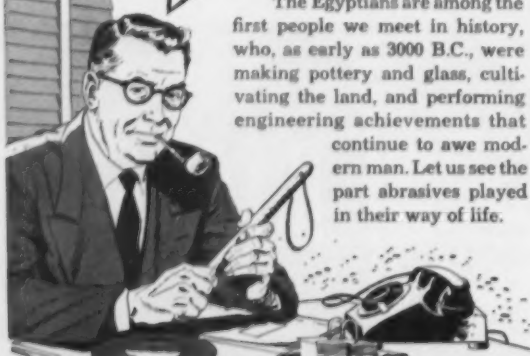


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to the skilled craftsmen of early Egypt....

NO. 2 OF A SERIES
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The Egyptians are among the first people we meet in history, who, as early as 3000 B.C., were making pottery and glass, cultivating the land, and performing engineering achievements that continue to awe modern man. Let us see the part abrasives played in their way of life.



A NUMBER OF EGYPTIAN PYRAMIDS and monuments are still standing, some for over 5,000 years. They are built of stone which was polished in many cases to fit to hairline dimension. This polishing or abrading was done with stones globular in shape that were especially prepared for this purpose.



AS EARLY AS 6000 B.C. Egyptians were using copper in making weapons and utensils. Later bronze, iron, and even steel weapons were made. The edges of these weapons were carefully abraded and honed by a fine-grained sandstone, the forerunner of the famous whetstones. Egyptian paintings indicate that a special quality metal may have been used for the edges of their weapons.



BUTCHERS in the land of the Nile carried a "steel" or sharpening bar attached to their belts. This was used for quick-honing their knives. These "steels" as they are referred to throughout ancient history were bars of a sapphire-like stone. Thus we see the sharpening or finishing of metal is not a recent development. The Egyptians were well acquainted with this method of abrasion.

THE STately COLUMNS, pedestals and statues built by the Egyptians were shaped and finished by abrasion. Moreover, Egyptian artistry in working with precious stones and metals indicates a high degree of abrasive skill.



The array of abrasive products which Chicago Wheel & Mfg. Co. makes today would stagger the imagination of the ancient Egyptian craftsmen. Mounted points and grinding wheels engineered to each customer's requirement are a daily job here at Chicago Wheel. Perhaps we can help you cut cost on your abrasive and metal finish problems.

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dates to remember

JUNE

SOCIETY OF AUTOMOTIVE ENGINEERS—Golden anniversary summer meeting, June 12-17, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 29 W. 39th St., New York.

EDISON ELECTRIC INSTITUTE—Annual meeting, June 13-16, Los Angeles. Institute headquarters are at 420 Lexington Ave., New York.

RADIO - ELECTRONICS - TELEVISION MANUFACTURERS ASSN.—Annual convention, June 14-16, Palmer House, Chicago. Association headquarters are at 777 Fourteenth St., N. W., Washington, D. C.

EXPOSITIONS

AMERICAN ELECTROPLATERS' ASSN.—42nd annual exposition, June 20-23, Cleveland Public Auditorium, Cleveland.

MACHINE TOOL SHOW—Presented by National Machine Tool Builders' Assn., International Amphitheatre, Chicago. September 6-17, inclusive. This is the first industry-wide showing since 1947 of the advances in machine tools.

INTERNATIONAL CONFERENCE ON COMBUSTION—June 15-17, Kresge Auditorium Building, Cambridge, Mass.

AMERICAN SOCIETY OF TRAINING DIRECTORS—11th annual conference, June 15-17, Los Angeles.

MALLEABLE FOUNDERS' SOCIETY—Annual meeting, June 16-18, The Greenbrier Hotel, White Sulphur Springs, W. Va. Society headquarters are at Union Commerce Bldg., Cleveland.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—19th annual applied mechanics conference, June 16-18, on the campus of Rensselaer Polytechnic Institute, Troy, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Diamond Jubilee semi-annual meeting, June 19-23, Statler Hotel, Boston. Society headquarters are at 29 W. 39th St., New York.

NATIONAL ASSN. OF COST ACCOUNTANTS—36th international cost conference, June 19-23, Waldorf - Astoria Hotel, New York.

AMERICAN ELECTROPLATERS' SOCIETY—42nd annual convention, Cleveland Public Auditorium, Cleveland, June 20-23.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION—June 20-24, 63rd annual meeting to be held at The Pennsylvania State University, University Park, Pa. Guest speaker is to be Secretary of Defense Charles E. Wilson.

ALLOY CASTING INSTITUTE—Annual meeting, June 26-28, Hot Springs, Va. Institute headquarters are at 32 Third Ave., Mineola, New York.

AMERICAN SOCIETY FOR TESTING MATERIALS—Annual meeting, June 26-July 1, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 1916 Race St., Philadelphia.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer general meeting, June 27-July 1, New Ocean House, Swampscott, Mass.

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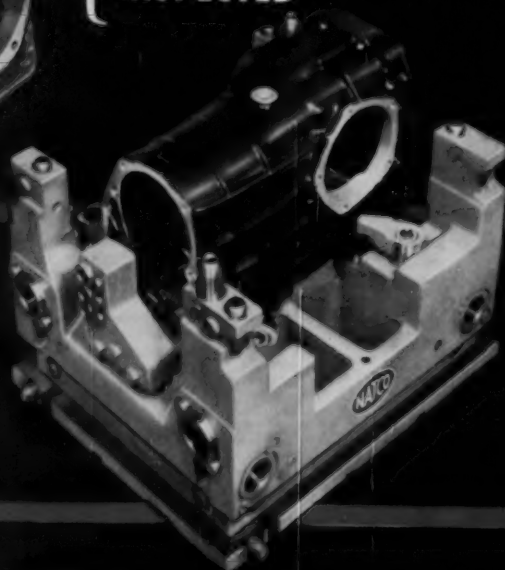
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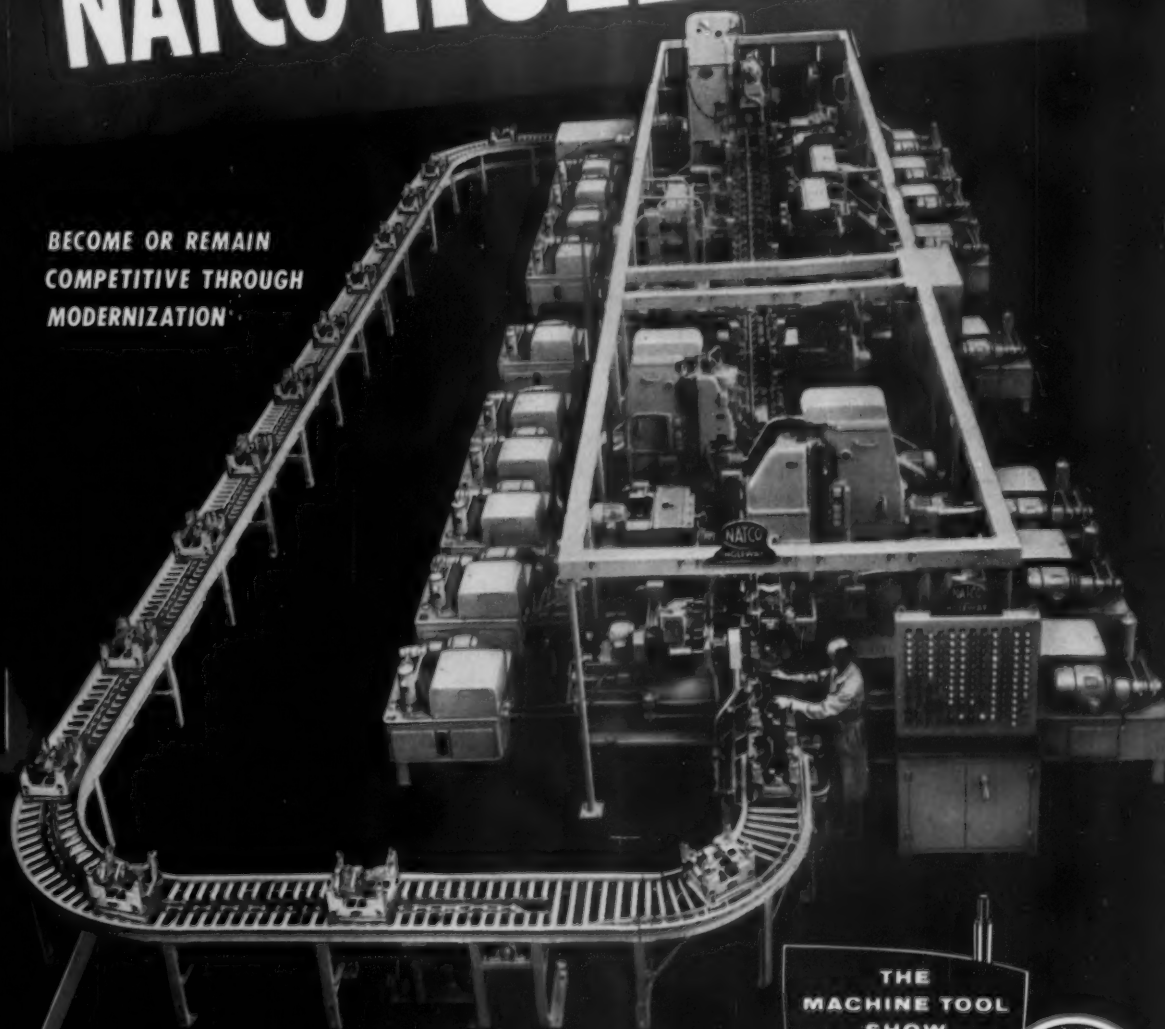
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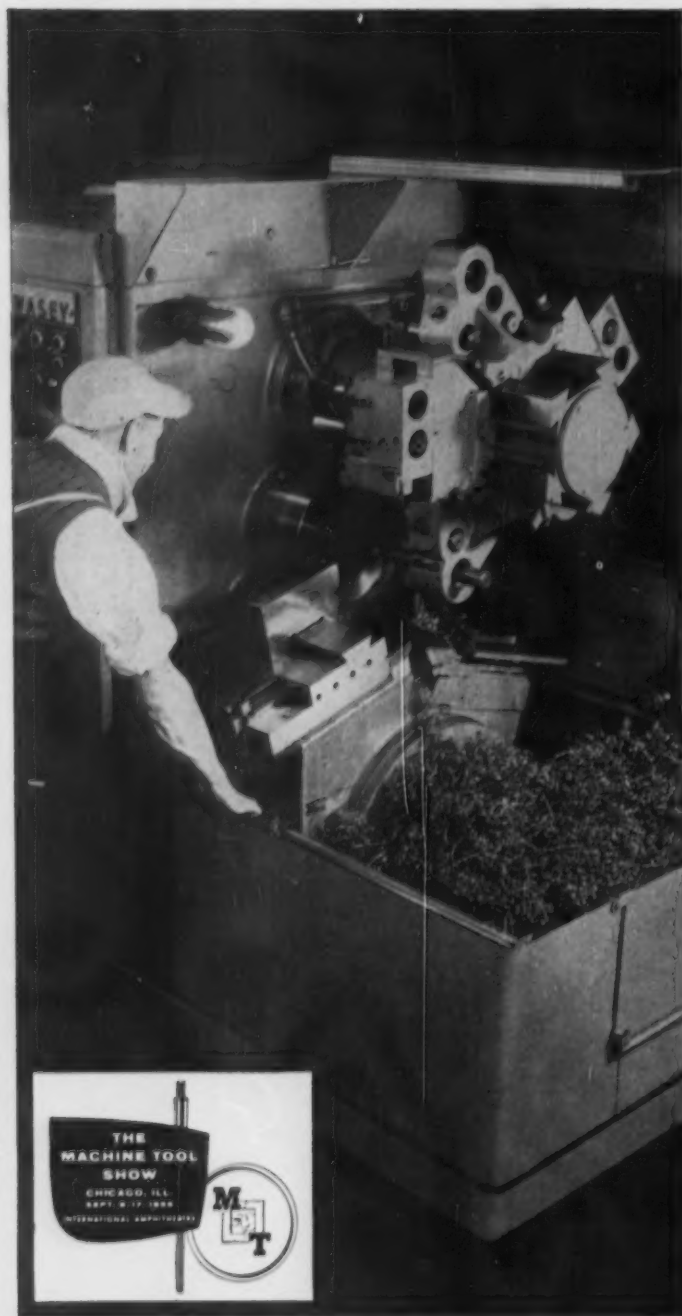
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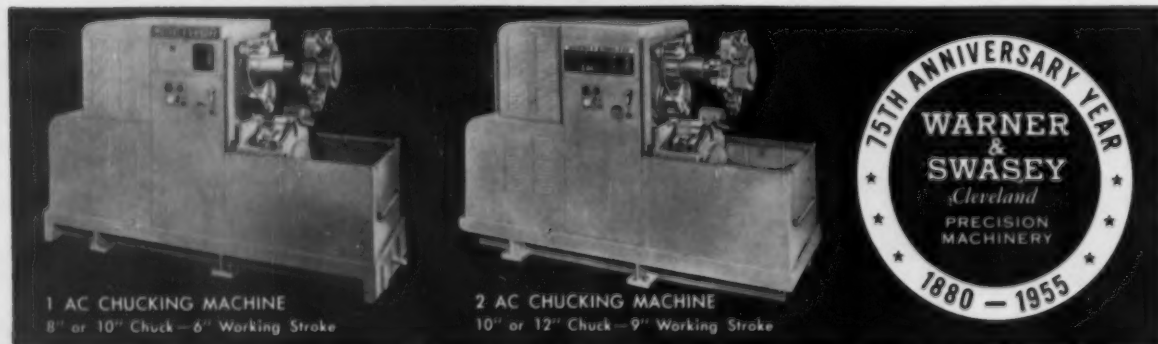
This progressive 11-year-old Cleveland company installed a Warner & Swasey 1 AC Single Spindle Automatic 3 years ago to speed up some of the turret lathe work on the many different jobs they turn out. They have since added one more 1 AC and one 2 AC.

With these Automatics they have been able to increase their capacity in the existing plant, speed up work, and cut costs. These cost savings, passed along to customers, mean lower quotations on jobs—which just naturally means more jobs coming into the Skidmore-Wilhelm shop, more profits.

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Most jobs here can be run in 60 to 70% of turret lathe time. J. W. Wilhelm, General Manager in Charge of Sales, commented on work speed-up this way, "Since we bought these Automatics, our cut-off saw can't keep up with production. And this never happened before."

But regardless of the size of your shop, an analysis of your work will undoubtedly prove that many of your present turret lathe jobs can be handled more efficiently, more profitably on a Warner & Swasey Single Spindle Automatic.



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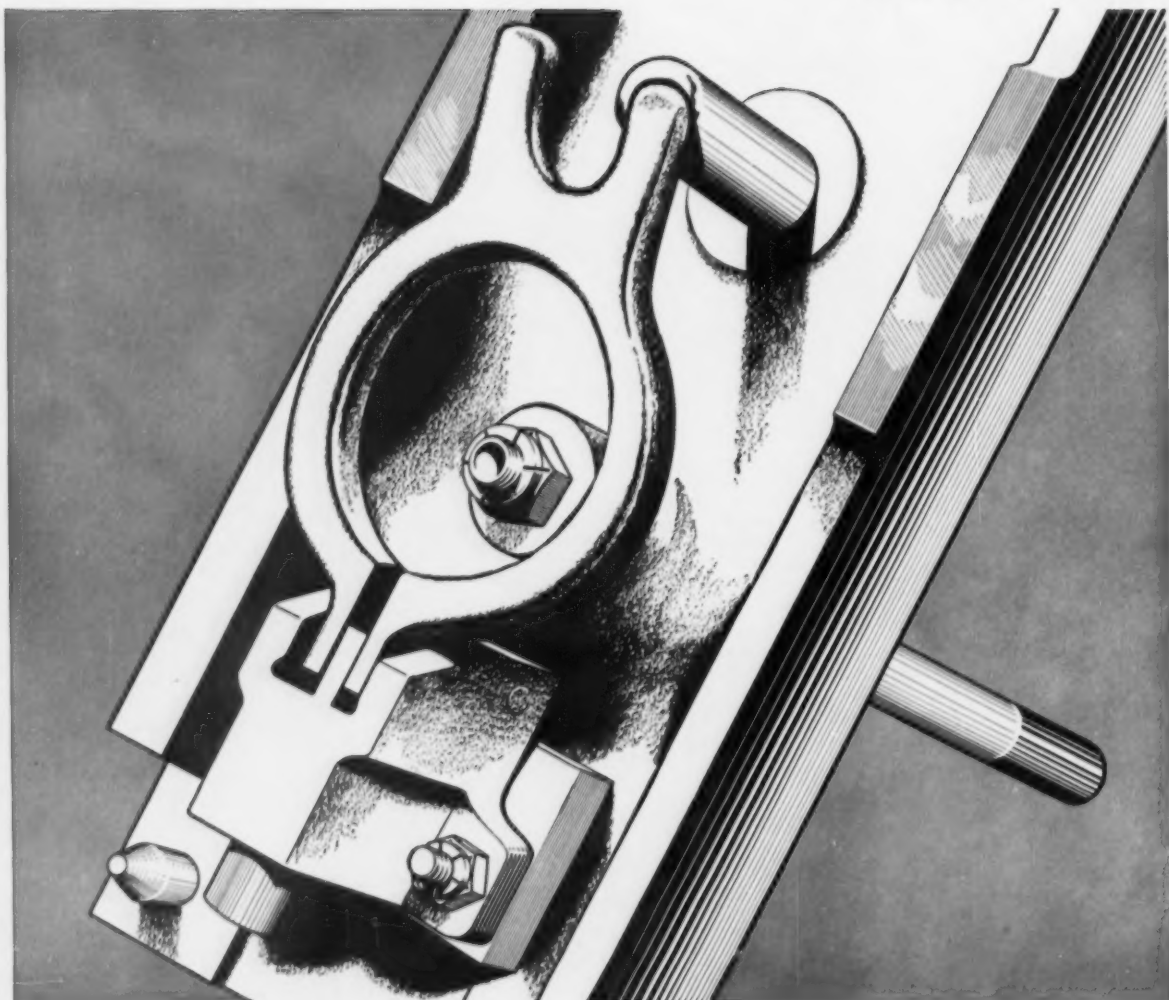
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FLEXLOC AT WORK



MORE AND MORE FLEXLOC LOCKNUTS are being used on assemblies where dependable locking is essential to the operating efficiency of the equipment. This stationary spindle is a good example of the difficult jobs FLEXLOC locknuts are doing throughout industry.

FLEXLOCs were put on this unit after a number of other locknuts had failed to keep the spindles tight. Even the high humidity, extreme vibration, and presence of lint and grease have not loosened the FLEXLOCs.

FLEXLOC Self-Locking Nuts—one piece, all metal—are available in a full range of sizes in any quantity. Standard FLEXLOCs are stocked by leading industrial distributors everywhere. Write for Bulletin 866 and samples. STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

DO YOU KNOW? Standard FLEXLOCs smooth off rough bolt threads. The locking threads on all-metal FLEXLOCs are not chewed up when used on rough bolts. Standard FLEXLOCs lock securely on bolts varying in diameter tolerances. The all-metal, resilient locking sections of the nut accommodate themselves to the diameter tolerances. Standard FLEXLOCs are one piece, all metal. They are not affected by temperatures to 550°F. Nuts lacking these features have a more restricted temperature range.

Standard FLEXLOCs lock securely—stopped or seated—when $1\frac{1}{2}$ threads of a standard bolt are past the top of the nut.

Standard FLEXLOCs are not affected by moisture, oil, dirt or grit. They lock efficiently under all conditions, regardless of the vibration encountered.

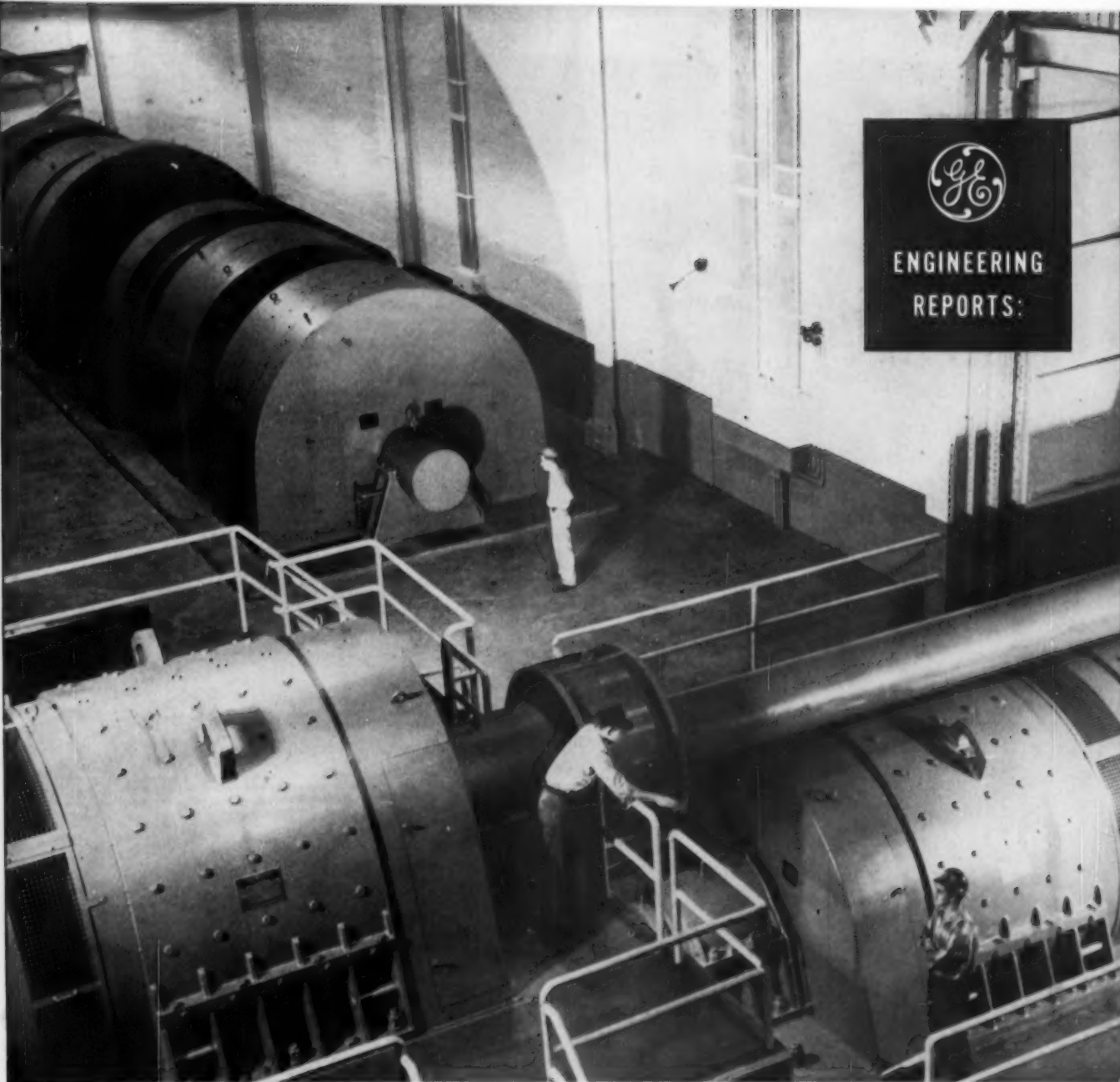


FLEXLOC
LOCKNUT DIVISION

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ENGINEERING
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AT JONES AND LAUGHLIN'S ALIQUIPPA, PA. MILL, FOUR GENERAL ELECTRIC 3000-HP MOTORS DRIVE . . .

Record-breaking reversing blooming mill

Jones and Laughlin's 44 in. blooming mill at Aliquippa, Pa., has smashed all previous world production records for small ingots. Powered by a coordinated General Electric drive system, this mill which is reversed from 70 rpm to 70 rmp in one second, has rolled 576 ingots in one eight hour shift—a 10 per cent increase over the old record set by the same mill when it was steam-driven.

J&L's conversion from steam to electric drive was an outstanding feat. In only 7 days, 14¼ hours the mill was back in full, around-the-clock production. This was more than two days ahead of the schedule set up for the changeover. For the story of the conversion and how G-E engineering services aided J&L in this operation see the following pages.

SEE CONVERSION STORY ▶

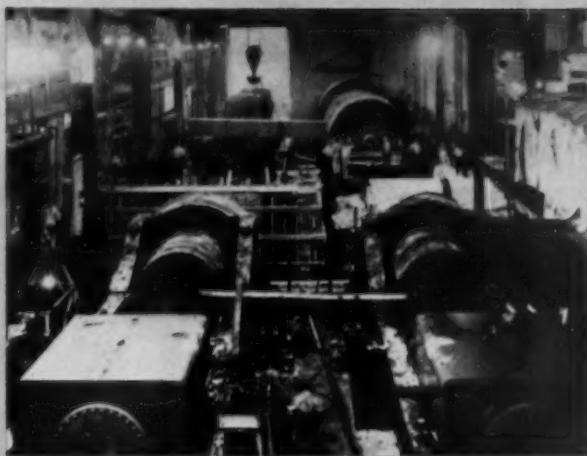
GENERAL  ELECTRIC



GENERAL ELECTRIC engineers pre-determined electric drive system adjustments with electronic differential analyzer, and built wooden scale model of drive to rehearse conversion.



GENERAL  ELECTRIC



JONES & LAUGHLIN engineers directed entire conversion, working day and night. Approximately 200 workmen per turn were utilized in the change-over which saw . . .

FULL PRODUCTION RESTORED IN 7 DAYS, 14½ HOURS

To help assure that Jones and Laughlin's conversion from steam to electric drive would be completed within 10 days, and that the new drive would help J&L surpass old production records, General Electric utilized its full range of engineering services.

Working closely with J&L, G-E analytical engineers simulated all operating conditions on an electronic differential analyzer. With G-E product engineers assisting, the design and adjustment of the electrical system were determined after "runs" of the mill on the analyzer were examined. As a result of these computer studies, the drive system was "tailored" to meet the exact requirements of Jones & Laughlin.

To help speed the conversion, a wooden scale model of the 12,000-hp main drive, its foundation and the steam engine foundation was

built to study the problems involved in the installation. The model was assembled and disassembled piece by piece as J&L and G-E engineers rehearsed the actual changeover.

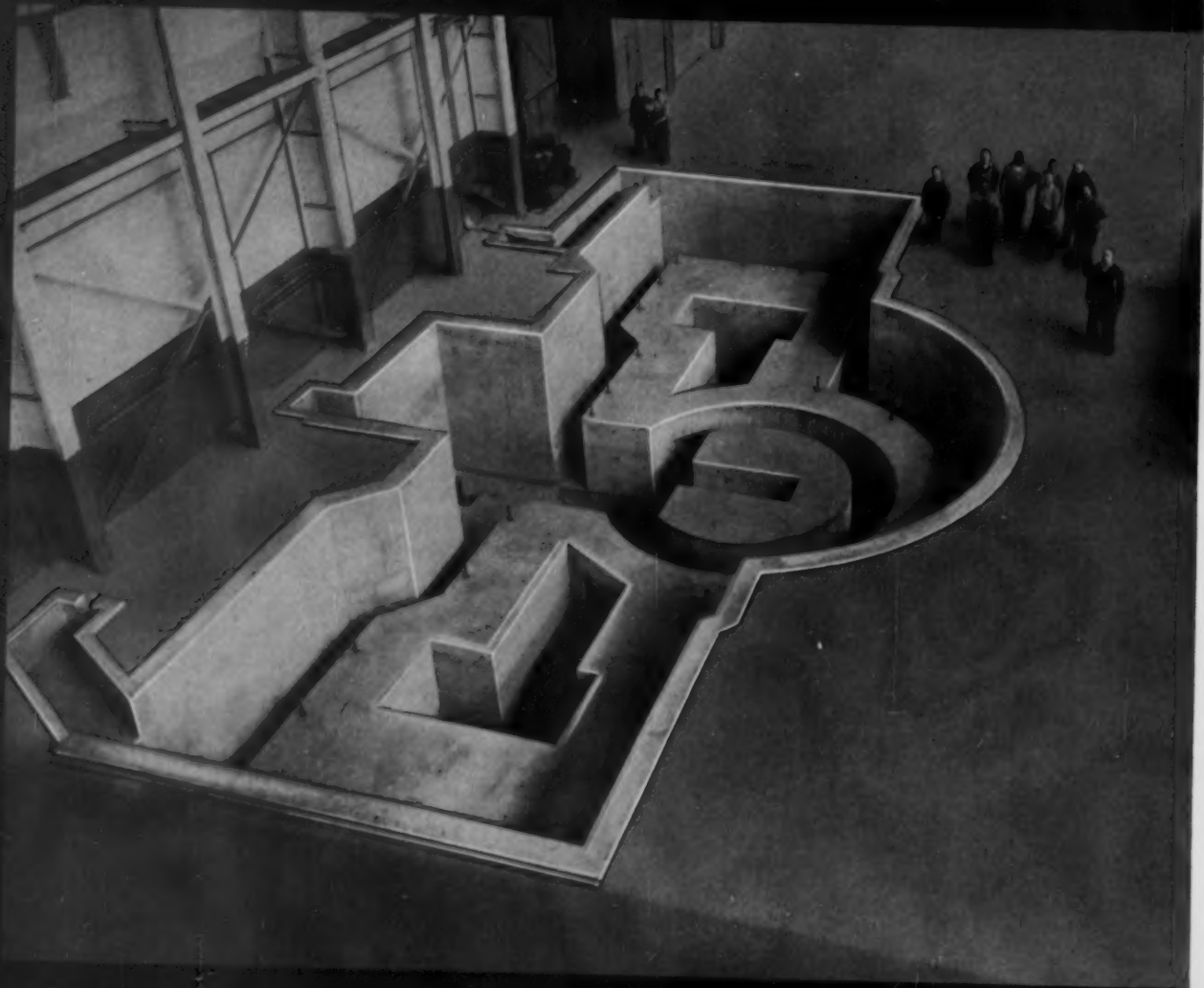
More time was saved when the electrical system was designed so that switchgear, m-g sets, exciter sets, control and even ventilating equipment could be installed and tested before the old drive was shut down. G-E field engineers were on hand to assist in the conversion and start-up of the drive.

These G-E engineering services are available to you. They will help save you time and money whether you are planning to modernize, expand, or build. For further information about these engineering services, contact your nearest G-E Apparatus Sales Representative, or send for bulletin GEA-2244. General Electric Company, Schenectady 5, N. Y. 659-106

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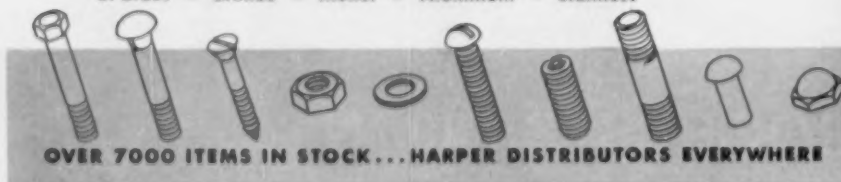
corrosion-resistant metals—brass, bronze, Monel, aluminum, and stainless steel.

Write the Harper Branch or Distributor near you for prices and delivery. Or, if you have a particular fastening problem, remember Harper engineers and metallurgists are available to help you.

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DESIGNING WITH ALUMINUM

NO. 13

This is one of a series of information sheets which discuss the properties of aluminum and its alloys with relation to design. Extra or missing copies of the series will be supplied on request. Address: Advertising Department, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

COLOR MATCHING OF ANODIZED ALUMINUM ALLOYS

COLOR MATCHING, in the sense of "tone" or "shade," among the various aluminum alloys can be rather complicated. The degree of complication depends greatly upon the type of finish which is desired for the various alloys which might be used in making up an aluminum assembly.

Generally, the appearance of various wrought and cast alloys will vary slightly in the mill-produced condition because of different alloy constituents at the surface. The simplest way to achieve the most uniform color among the various alloys is to polish them mechanically. Practically all freshly polished aluminum alloys look alike. However, ordinary weathering or aging in industrial atmospheres will cause slight surface film reactions. The products of these reactions will differ for the various alloys. Generally, aluminum alloys retain a bright pleasing appearance despite extended exposure to the weather. A few alloys will darken upon weathering.

Alloys that contain silicon, such as 4043, and those that contain copper, such as 2024, are among the alloys which darken rapidly upon exposure in the unprotected condition. There is no way to prevent this except by anodizing, chemically coating or painting.

Chemical conversion coatings, while often providing satisfactory protection from the environment, are not usually suitable for decorative applications. If a good permanent color is important to a design, and if painting is not desirable, anodizing is necessary. In a situation such as this a very careful selection of alloys must be made before anodizing in order to obtain a good color match—or contrast if it is desired. All alloys will exhibit slight to marked color differences after being anodized. Some alloys are fairly close in anodized color, especially when the anodic coating is not

too thick. Figure 1 shows both matching and contrasting anodized aluminum alloys.



Fig. 1. Anodized 6063 extrusion alloy and 5005 sheet alloy lie side by side on a sheet of anodized 4043 sheet alloy which is quite dark. Notice that the 6063 and the 5005 match each other in color value but contrast sharply with the 4043.

A recognition of the technical principles which must be employed in the selection of the various alloys for color matching of their anodic coatings is of value in many applications of aluminum. In the architectural field alone the subject of color matching in anodized aluminum is assuming greater importance. Almost daily aluminum usage increases in such things as curtain wall construction. Table 1 lists many of the aluminum alloys in general use today and shows the approximate color matches obtainable through anodizing. For maximum color similarity slight variations in the anodizing process are necessary and should be established by the processor. The chemical compositions and tempers of the alloys are the basic reasons for differences in color after anodizing.

The commercially pure materials, such as 1100, EC, 1180 and the cladding material of Alclad alloy 2024, all

exhibit relatively good color matches after anodizing. Those Alclad alloys which employ 7072 as the cladding, e.g. 3003, 3004, 5050, 6061 and 7015 will match well after anodizing. As a class, alloys containing magnesium provide relatively good matches, especially if the anodic coating is of moderate thickness. The magnesium content exerts a slight influence upon the color, but the purity of the alloy base is even more important. As a general rule, the higher the purity of the alloy base, the more transparent and the brighter the appearance of the anodic coating. Thus, anodized 5052 is brighter than anodized 5050.

Alloys containing copper, for instance 2014 and 2024, generally develop dark unattractive coatings when anodized in the annealed condition. The same alloys, when properly heat treated and quenched, may give relatively clear, attractive anodic coatings that will approximately match anodic coatings on alloys 1100 and 5005. A similar situation exists for 7075 alloy.

The high silicon alloys, such as No. 43 and No. 380 which are frequently employed in castings, present a very difficult problem since the silicon constituent darkens upon anodizing and, with sufficient anodic coating thickness, may be quite black. It is impossible to match such anodized casting alloys with most other aluminum alloys in the anodized condition. A match is possible with alloy 4043.

Aluminum casting alloys containing principally magnesium rather than silicon, on the other hand, match reasonably well with most other alloys. Casting quality and technique have an

PLEASE TURN TO NEXT PAGE

DESIGNING WITH ALUMINUM No. 13 Continued

TABLE 1

APPROXIMATE COLOR MATCHES OF ANODIZED ALUMINUM ALLOYS

O = Relatively Good Matching X = Better Matching

Sheet and Plate Alloys	Sheet and Plate Alloys																Extrusion Alloys					Casting Alloys					
	1180	1100	2014°	2024°	Alclad 2024	3003	Alclad 3003	Alclad 3004	4043	5005	5050	Alclad 5050	5052 **	6061	Alclad 6061	7075°	Alclad 7075	1100	3003	2024°	6061	6063	7075°	43	A214	A218	380
1180	X	O			O													O									
1100	O	X	O	O	X					O						O		X		O						O	O
2014°		O	X	O						O								O		O						O	O
2024°		O	O	X						O								O		X						O	O
Alclad 2024	O	X			X													X									
3003						X													X								
Alclad 3003							X	X				X			X		X									O	O
Alclad 3004							X	X				X			X		X									O	O
4043									X															X			X
5005		O	O	O						X	O		O	X		O		O		O	X	X	O			O	O
5050										O	X		O	O		O					O	O				O	O
Alclad 5050							X	X				X			X		X									O	O
5052**										O	O		X	O								O	O			O	O
6061										X	O		O	X								X	O			O	O
Alclad 6061							X	X				X			X		X									O	O
7075°		O								O						X		O					X			O	O
Alclad 7075							X	X				X			X		X		O					X		O	O
Extrusion Alloys																											
1100		O	X	O	O	O				O						O		X		O				O			
3003							X												X								
2024°			O	O	X													O		X						O	O
6061										X	O		O	X							X	O				O	O
6063										X	O		O	O							O	X				O	O
7075°		O								O			O	O			X		O				X			O	O
Casting Alloys																											
43									X															X			X
A214			O	O			O	O		O	O	O	O	O	O	O	O			O	O	O	O			X	O
A218			O	O			O	O		O	O	O	O	O	O	O	O			O	O	O	O			O	X
380									X															X			X

* Heat treated and quenched

** For relatively thin anodic coatings, i.e., not exceeding 20 min anodizing

even greater influence on anodizing characteristics than does the alloy composition.

Among the sheet and plate alloys it is almost impossible to match alloys containing manganese, such as 3003, with other alloys as far as color in the anodized condition is concerned.

Some examples of compatible pairs for anodizing are 5005 and 6063, 5005 and 6061, 1100 and Alclad 2024. Numerous other examples may be chosen based on the principles outlined above. Of special interest to designers and engineers who are concerned with building materials and architectural design, is the excellent color match which may be obtained in the anodized condition

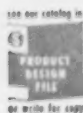
with the sheet alloy 5005 and the extrusion alloy 6063. Alloy 5005 is a magnesium-containing alloy (nominal 0.8% Mg) with strength and formability approximately equal to those of 3003 alloy. Alloy 6063 is the extrusion alloy which is employed almost universally in window frame molding and store front trim. Where an architect wishes to use an anodized sheet product close to an anodized 6063 extrusion, a definite clash in color will result if alloy 3003 is employed as the sheet material. However, alloy 5005 when employed in place of alloy 3003, exhibits an excellent color match with 6063 when both alloys are anodized to the same coating thickness.

The understanding and application of

the principles affecting the colors of anodized aluminum alloys will provide the means for attractive architectural design work. These same principles will undoubtedly influence the choice of aluminum alloys for products outside the field of architecture.

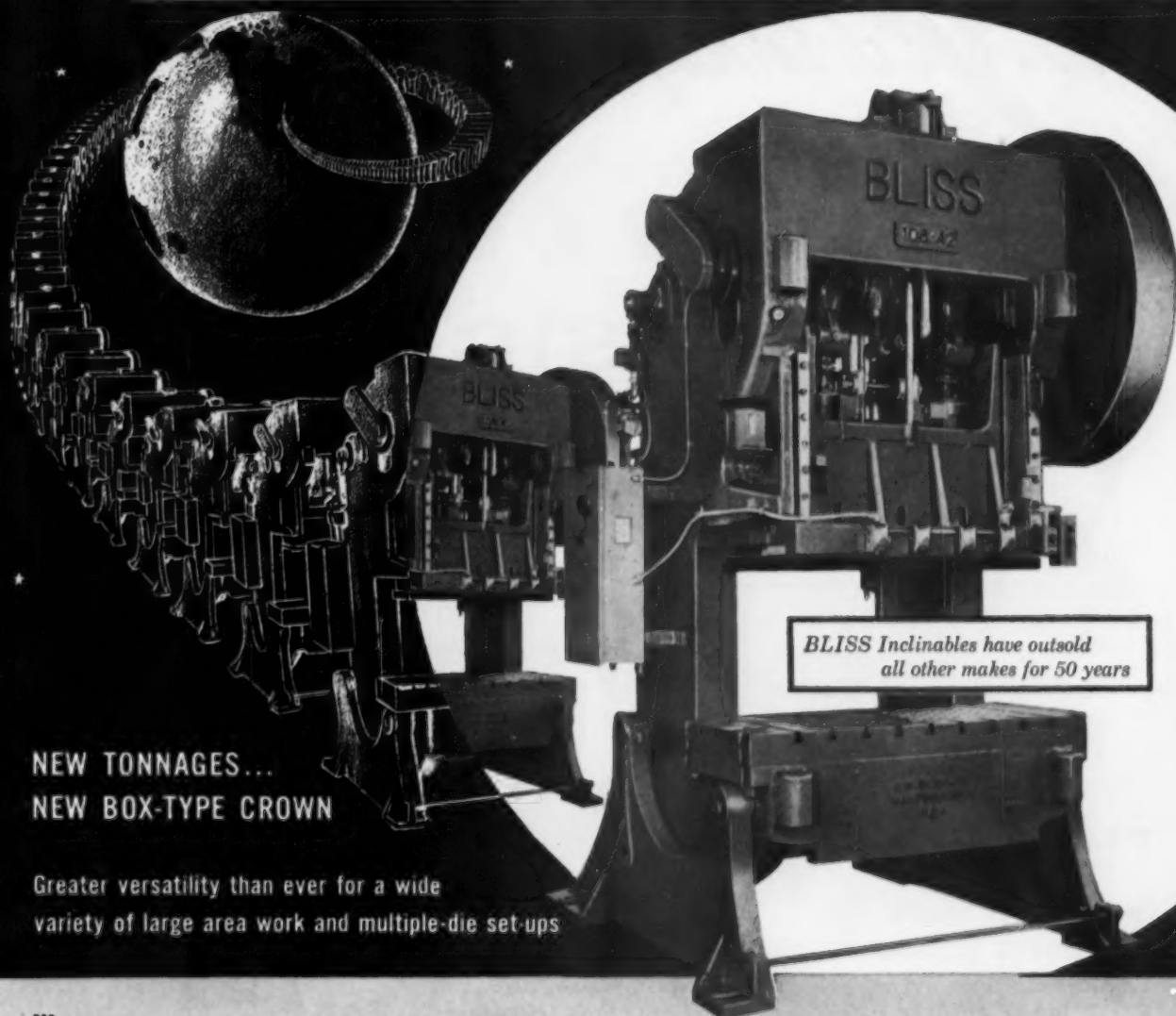
Further information concerning the color matching of anodized aluminum alloys may be obtained from the Kaiser Aluminum sales office listed in your telephone directory, or through one of our many distributors. Kaiser Aluminum and Chemical Sales, Inc. *Executive Office:* 6675 Kaiser Building, Oakland 12, California; *General Sales Office:* Palmolive Building, 919 North Michigan Ave., Chicago 11, Illinois.

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variety of large area work and multiple-die set-ups

When you need a wide die area, this is the press to handle tough blanking, forming, drawing, perforating.

Add a Bliss pneumatic cushion (the press is set up to receive it) and you extend the range of draw work.

For high production work, the addition of a Bliss feed (single or double roll, dial) will give you runs of 200 or more strokes per minute.

Improvements Add New Standards of Accuracy

• **New, Heavy Box-Type Crown**—the same as is used on rugged Bliss automotive presses—adds mass, rigidity... minimizes deflection. Gives 100% up-an-ug bearing support. Adds strength through entire cast Meehanite gap frame. Keeps slide in perfect alignment even under unusual off-center loads.

• **Air Friction Clutch and Brake**—cool-running. Automatically adjusts for wear, making for fast action between full brake and engagement at

all times. Friction plates easily replaceable without tearing down clutch.

• **Other Features**—Precision gibbing, roller bearings, extra-heavy ball-seat connections, heavy-duty forged shaft.

• **All Parts Available from Stock**—Parts are interchangeable and available from stock through any Bliss sales office.

• **Reasonably Priced**—Only Bliss offers a standard double-crank inclinable (to 161 tons) and with it offers the same low cost value as all Bliss Inclines. Write for catalog and information about our Deferred Payment Plan.

E. W. BLISS COMPANY, CANTON, OHIO

BLISS

SINCE 1857

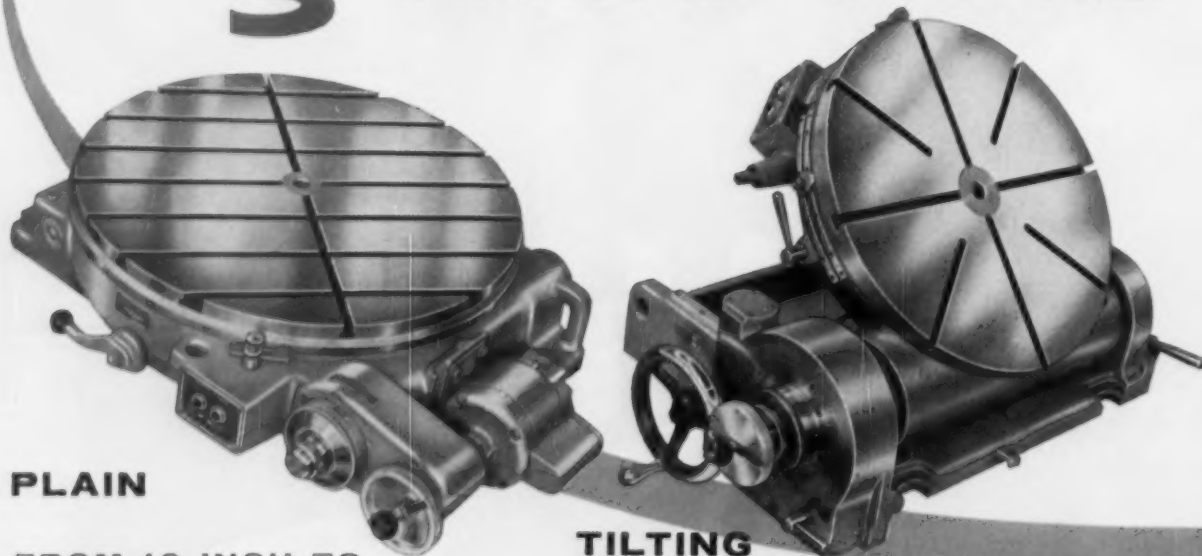
is more than a name...it's a guarantee

RUGGED CONSTRUCTION FOR MACHINING

... On Jobs Requiring ACCURATE

use

PRATT & WHITNEY 3 BASIC TYPES



PLAIN

**FROM 10 INCH TO
50 INCH DIAMETERS**

... Plain Rotary Tables, 12" and 20" dia.; Motor-Driven Plain Rotary Tables, 24", 30", 42" and 50" dia.; Tilting Rotary Tables, 10", 16" and 24" dia.; Motor-Driven Vertical Rotary Tables, 30" and 48" dia.

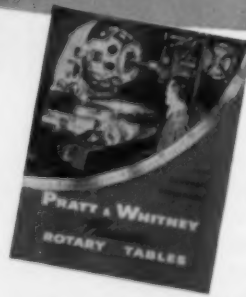
TILTING

SEND NOW FOR COMPLETE INFORMATION

Mail coupon on opposite page—or write on your Company letterhead—for your free copy of Circular No. 558 describing the complete P&W Precision Rotary Table Line.



... PLAN TO VISIT US AT BOOTH 1219... SEE
HOW P&W PRECISION MACHINE TOOLS CAN
HELP YOU REDUCE COSTS, INCREASE PRO-
DUCTION AND IMPROVE QUALITY.



BUILT-IN PRECISION

FOR INSPECTION

Circular Spacing and Angular Positioning

PRECISION

ROTARY TABLES



VERTICAL

Here is a Sound Investment That Pays Off in . . .

• **EXTREME ACCURACY . . .**

P&W Rotary Tables index to any angle in 360° within seconds of arc. Ideal for precision inspection and circular indexing.

• **GREATER ECONOMY . . .**

by eliminating expensive machining fixtures and time-consuming set ups. Complicated inspection operations are performed dependably and rapidly.

• **LONGER LIFE . . .**

Built for ruggedness and stamming as well as accuracy, P&W Rotary Tables give continuous dependable service year after year.

• **EXTRA SPEED . . .**

Compound angle settings with Tilting Tables are quickly accomplished by tilting the table to the required angle and then rotating. Jobs ordinarily difficult and time-consuming become fast and simple. Motor-driven models handle heavy work easily, conveniently.

PRATT & WHITNEY

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DIVISION NILES-BEMENT-POND CO.

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SINCE

MACHINE TOOLS • CUTTING TOOLS • GAGES

1860

June 16, 1955

27



Hardworking backhoe provides a tough test for Pittsburgh tubes . . .



First step in production of hydraulic cylinders at Hydreco Division of The New York Air Brake Co. is to cut Pittsburgh Steel tubes to correct length and drill holes for pipe fittings.

Where Steel Makes Dirt Fly

■ Hydreco Speeds Machining Operations, Reduces Production Costs By Using Pittsburgh Tubes To Make Hydraulic Cylinders For Power Backhoes

Eight hard-working hydraulic cylinders, operating smoothly in unison, make the dirt fly when a powerful Wain-Roy Backhoe takes over on an excavation job.

Oil hydraulic cylinders, which are giving industry a lift in scores upon scores of applications, get one of their most rugged tests in this sturdy backhoe. That's because the cylinders are in almost constant use throughout the working day. They're always exposed to the elements—battling sticky mud one day and gritty dust the next.

Producing hydraulic cylinders for long useful life on a tough job like this is an exacting business. It requires the best of materials and painstaking workmanship.

Quality materials and precise craftsmanship are stressed at

the Cleveland, Ohio, plant of Hydreco Division, The New York Air Brake Company, where thousands of cylinder assemblies are made of Pittsburgh cold drawn, stress-relief annealed tubes for the Wain-Roy Backhoe.

Hydreco picked Pittsburgh Steel as its major supplier of tubes because Pittsburgh tubes cut production losses and speed up grinding, turning and honing operations.

Why? Because they're held to close tolerances. They're straight and uniformly concentric, have good machinability, top weldability and a smooth, clean surface. All this means Hydreco workers have less metal to cut away and fewer scrapped tubes.

The variety of operations required to convert tubes into fin-



The completed spud assembly is now ready for hand welding onto the cylinder tube. This cylinder, when completed, will be used to raise and lower the boom on a backhoe.

ished hydraulic cylinders demonstrates how use of good tubing reduces shop costs while improving the quality of the finished product.

Hydreco first cuts Pittsburgh tubes into proper lengths, and faces off the ends. Hydreco can use standard Pittsburgh tubes because they have close dimensional accuracy. For the backhoe, MT1015 tubes, with a 10 to 20 carbon spread, fill the bill.

The tubes range in outside diameter from 2 inches to 7 inches, depending on whether the tube will be used to swing the boom, raise and lower the dip stick, dump the shovel or to actuate the two stabilizers which give the backhoe a firm footing. All wall thicknesses are finished to a quarter-inch.

After counter drilling tube ends, the pipe fittings (or spuds) are automatically welded in place. Good weldability of Pittsburgh tubes permits fast operation without warping.

Honing follows, the tubes get finished machining and then plug ends are welded in place. If no further machining is required, cylinder tubes and pistons are assembled and placed on a test rack where they are operated under pressures of 1,500 pounds per square inch.

The high tensile strength built into the tubes and their freedom from seams and other defects result from skilled know-how on the part of men in the Pittsburgh Steel tube mills who use the best available equipment. That gives the final users assurance of long



Piston rods for hydraulic cylinders get a very high polish from a continuous crocus cloth belt. The piston rod being polished here is for a 38½-inch long cylinder.

and satisfactory service.

Hydreco depends on Pittsburgh Steel for tubes used in many additional applications. The company has a well established reputation for producing engineered, custom-made hydraulic cylinders. Most Hydreco customers for hydraulic assemblies have special requirements for space, mountings and hydraulic connections. The company produces these engineered cylinder assemblies, single or double acting, in sizes ranging from 1½ inches in diameter to 8 inches.

If mechanical tubing fits into your picture, it will pay you to investigate how Pittsburgh tubes can speed your operations while lowering costs. Contact the nearest district sales office. A Pittsburgh Steel representative may have money saving suggestions for you. Or write for the new tubing handbook which will give you complete information.

Pittsburgh Seamless Mechanical Tubing is also available from:

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Drummond McCall & Co., Limited
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillsdale, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

Tubular Sales
Detroit, Michigan

Ward Steel Co.
Boston, Massachusetts

Ward Steel Service Company
Dayton, Ohio

"Everything New But The Name"

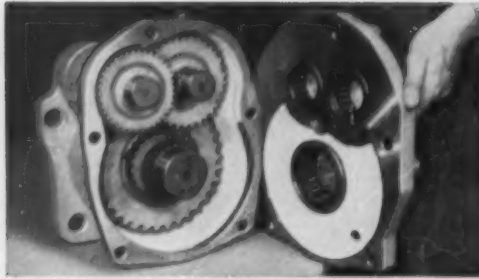
Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

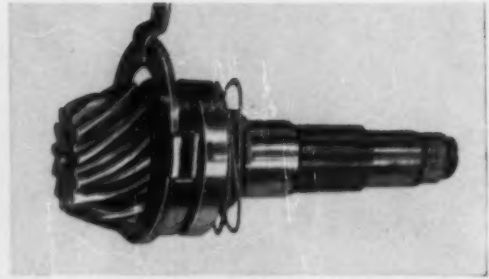
DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland • Columbus • Dallas
Dayton • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh
San Francisco • Tulsa • Warren, Ohio. PLANTS: Monessen, Pa. • Allenport, Pa.
Akron • Los Angeles • Unionville, Conn. • Warren, Ohio • Worcester, Mass.



How you can put hundreds of



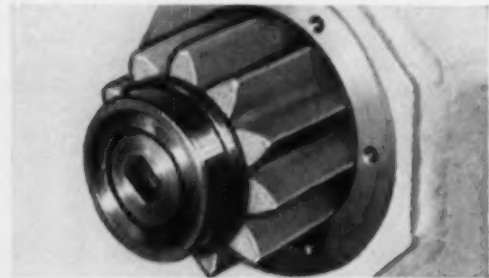
Gear Box Gears—Republic 4320H and 4820H Alloy Steels



Transfer Case Pinion—Republic 4820H Alloy Steel



Transfer Case Ring Gear—Republic 4820H Alloy Steel



Final Drive Pinion—Republic 4820H Alloy Steel



horsepower to work with safety

LeTourneau-Westinghouse does it with the help of Republic Alloy Steels on the Model B Tournapull. This high-speed, self-propelled scraper is designed to carry 23 yards of earth at speeds up to 28 miles per hour.

Republic Alloy Steels are used in this giant for final drive pinions, transfer case ring gear and pinion, gear reduction box gears and pinions, and electric motor pinions.

Alloy steels provide an outstanding combination of qualities essential to safety in designing equipment to carry heavier loads at higher speeds. In these fine steels you will find highest strength values—plus an unusually high strength-to-weight

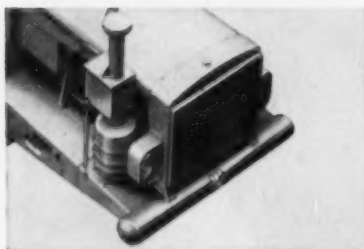
ratio that permits transmission of hundreds of horsepower through tough, strong gears and shafts free from excessive weight.

And when you add to these qualities uniform hardness, that means reduced wear—plus resistance to fatigue, shock, stress and temperature extremes—you have a material with the ability to insure safety, extend equipment life, and to cut maintenance and replacement costs.

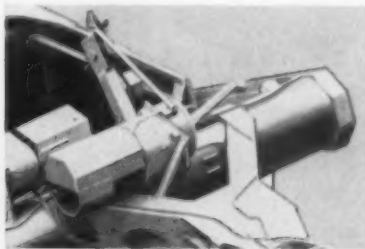
Republic—world's largest producer of alloy steels—is ready to assist you with metallurgical and engineering assistance in the most efficient and economical application of these fine steels to your product. The coupon will bring you more information.

REPUBLIC STEEL

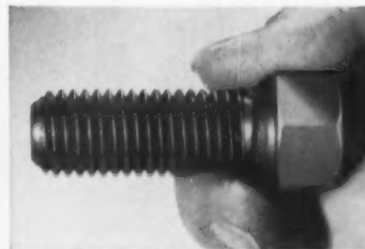
World's Widest Range of Standard Steels and Steel Products



ANOTHER REPUBLIC PRODUCT. Electric Resistance Weld Steel Pipe, is used for the front bumper on the Model B Tournapull. Both this type and Continuous Butt Weld Steel Pipe have been serving industry for years in all types of applications. Today they are better than ever. They have many mechanical applications, like the one shown above, in addition to being used for transmission of gas, water, steam.



PINS, BRACES AND REINFORCEMENTS on the Model B Tournapull are made from Republic Hot Rolled Carbon Bars. Countless forging and general manufacturing companies look to Republic as a dependable source for hot rolled steel bars. Rounds, squares, hexagons, octagons and flats are produced in all grades of carbon, alloy and stainless steels. Republic also supplies hot rolled special sections for economical mass production of steel parts.



REPUBLIC COLD FINISHED CARBON BARS are used by LeTourneau-Westinghouse for cap screws and bolts. Cold drawing gives steel parts higher strength, greater uniformity and a bright, smooth finish. Republic's Union Drawn Division supplies high-quality cold finished bars in all standard and special carbon, alloy and stainless analyses. And to get the most out of these steels, Republic offers you the services of expert metallurgists and machining specialists.



REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio



Please send more information on:

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|---|--|
| <input type="checkbox"/> Alloy Steels | <input type="checkbox"/> Steel Pipe |
| <input type="checkbox"/> Cold Finished Bars | <input type="checkbox"/> Hot Rolled Bars |

Name _____ Title _____

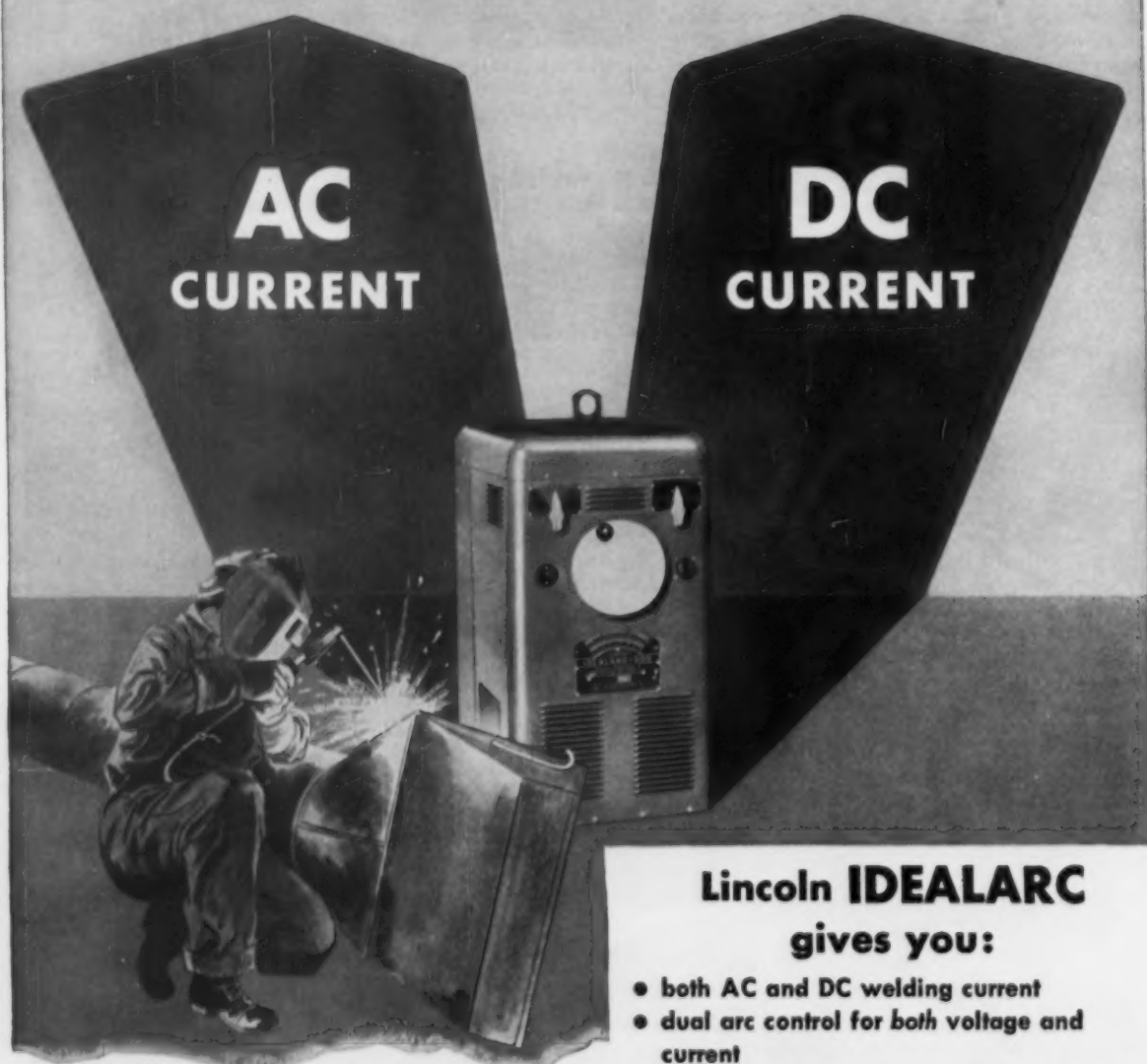
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Now...for the price
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ONE WELDER with BOTH AC and DC WELDING CURRENT



**GET THE FACTS ON IDEALARC
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Lincoln IDEALARC gives you:

- both AC and DC welding current
- dual arc control for both voltage and current
- arc-booster starting on DC as well as AC
- operation on single phase power

THE LINCOLN ELECTRIC COMPANY

Dept. 1506, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Put this "Plus" in your polishing

ALUNDUM* B abrasive
adds the time-saving
product-improving
"TOUCH of GOLD"
to every set-up

Here are the reasons why ALUNDUM B abrasive in your polishing set-ups will help each wheel last longer, produce more, and polish better:

Excellent cutting action. This development of Norton's famous ALUNDUM abrasive cuts fast, clean and cool — ideal for polishing jobs ranging from roughing to finishing.

Controlled uniformity. Grains are of uniform blocky shape. No flats, slivers or undersized grains to loaf on the job. No oversized grains to mar surfaces.

Maximum adhesion. Norton's special treatment for high capillarity keeps grains from pulling out before each has done its full share of work. Whether you use cement or glue, you get this same firm-clinging action that means longer, more productive wheel life.

Made in all grit sizes, from 20 through 240, to cover the widest range of polishing operations.

Your Norton Distributor

is ready with prompt service on ALUNDUM B polishing abrasive. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

G-289

*Making better products...
to make your products better*

NORTON

and its BEHR-MANNING division

NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories
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*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



**It's too good
to keep!**

**"...you get quick cooperation
at Lamson & Sessions"**

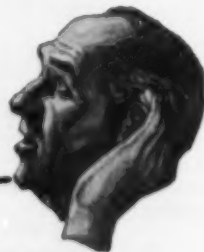
Yes sir, it's true... the cooperation you get when you work along with Lamson & Sessions is worth talking about.

Many people, with fastener problems, have found that "Service" and "Cooperation" are more than just words at Lamson.

When you bring a problem to Lamson & Sessions involving critical delivery dates, unique specifications, or fastener budget limitations, the folks at Lamson pitch in enthusiastically to solve the problem.

This "something extra" is the reason so many of our customers have said that they *enjoy* doing business with Lamson & Sessions. This same cooperation and attentive service is the difference between just-another-bolt-factory and the world's leading fastener manufacturer... Lamson & Sessions.

You, too can enjoy this difference.



YOU GET MORE WHEN YOU BUY FROM...

The **LAMSON & SESSIONS Co.**

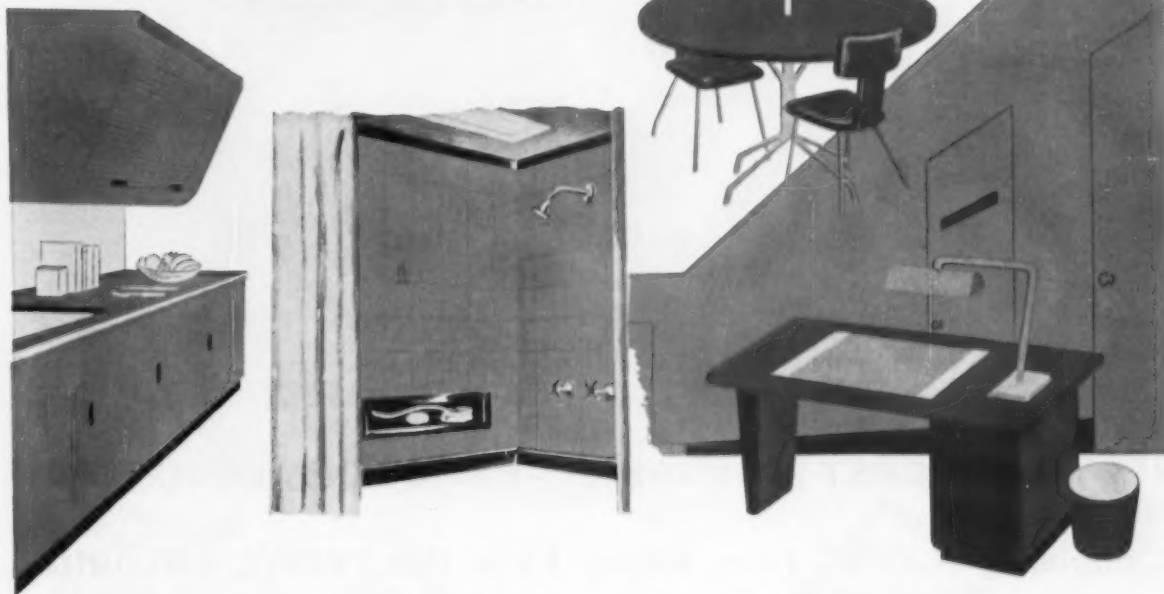
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CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO



Marvibond* weds vinyl to metal

for new **BEAUTY**,
new **STRENGTH**,
new **PERMANENCE!**



Now you can enjoy all of the advantages of metal—*without the disadvantages of rust and corrosion*—with colorful surface effects that are practically unlimited!

Marvibond—Naugatuck Chemical's recently developed vinyl-to-metal laminating process—bonds tough Marvinol® vinyl sheeting to practically any kind of sheet metal, *permanently*, to give you all these "extras"...

- **permanent protection against rust and corrosion!** One of the most inert of all known materials, vinyl resists acids, alkalies, salt water, alcohol, household chemicals, corrosive industrial liquids and atmospheres.
- **lastingly beautiful surface effects!** Vinyl can be given practically any color, in many finishes, including leather-like grains, marble patterns, prints, weave-like designs.

* Patent applied for

- **superior abrasion resistance!** Marvinol vinyl finish resists abrasion far better than paints, lacquers, varnishes, phenolic or alkyd finishes, will not chip, crack, or craze.
- **greater utility!** Marvibonded metal eliminates many costly finishing operations—can be drawn, crimped, sheared, embossed, and otherwise formed *without damage to coating or bond*.

Investigate the unique advantages this new material combination offers *you*—in furniture, cabinets, wainscoting, tile-like walls, partitions, applications by the *building-full*.

* * *

Write us for further data, samples, or the names of the licensed MARVIBOND laminators nearest you.



Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut



BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis • New York • Philadelphia • **IN CANADA:** Naugatuck Chemicals, Elmira, Ontario
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latexes • Cable Address: Rubexport, N. Y.



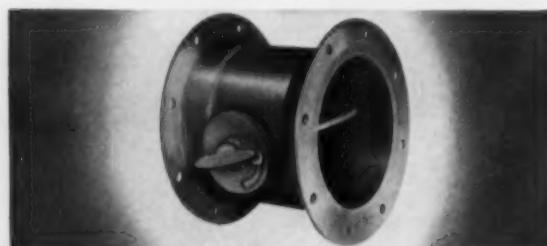
HAVEG 1810 PVC SELF-SUPPORTING TANKS offer maximum chemical resistance and mechanical stability. Individually designed with a wide margin of safety. Welded-on structural shapes guard tanks against deflection.



FUME DUCT MADE FROM HAVEG 1810 PVC is both low cost and planned to meet your system's needs. Haveg's Engineering Department works with you for simplicity of design, ease in shipping, installing, and maintaining.



HAVEG ALSO LINES TANKS WITH HAVEG 1810 PVC. Steel, wood or concrete tanks can be made serviceable, completely corrosion-resistant, with a tightly bonded PVC lining. Haveg uses a special PVC laminate, can do work in the field.



HAVEG FABRICATES PVC into special butterfly dampers that can be installed in either round or rectangular fume duct. Dampers are instantly adjustable and locked in place, contain few parts. Let Haveg make special items for you.

NEW, LOW COST CORROSION-RESISTANT EQUIPMENT

...made by **HAVEG** from Haveg 1810 POLYVINYL CHLORIDE

TRADE MARK REG. U. S. PAT. OFF.

Haveg, America's first molder of plastic corrosion-resistant equipment, now adds rigid, unplasticized polyvinyl chloride equipment . . . supplied in new Haveg Grade 1810 . . . to its complete line. The same Haveg fabricating skill, the same Haveg practical knowledge of corrosion engineering backs your order. Briefly, here is what Haveg has to offer:

CUSTOM FABRICATION of self-supporting tanks, steel tanks lined with PVC, complete fume removal systems from hood to weather cap. Haveg also makes angles and channel sections, troughs, flanges, pans, trays and dippers in Haveg 1810 PVC.

A trained Haveg engineer surveys your requirements, furnishes test samples, price and design information . . . tells you if PVC can save you money, help you fight corrosion better.

A COMPLETE INVENTORY OF STANDARD PVC ITEMS, ready for prompt delivery:

Sheet stock: in your choice of 144 x 44", or 72 x 44" size, in thicknesses of 1/16, 1/8, 3/16 and 1/4"; and in 60 x 48" size — 3/8, 1/2, 3/4 and 1" thick.

Bar stock: ten foot lengths from 1/4 to 2" diameters.

Pipe: Furnished in 1/2 to 6" diameters in 10 and 20' random lengths. Variety of ends, including plain, threaded, screwed flanged, welded flanged. Plain and socket-end PVC pipe is also made for cemented, or cemented and welded, installation. Complete line of pipe fittings are fabricated and stocked by Haveg. Maximum recommended working pressure for all pipe sizes: 25 psi at 75°F.

CHEMICAL RESISTANCE RATINGS show that Haveg 1810 has excellent resistance to acid attack, extending even to

strong oxidizing acids in high concentrations. Resistance to alkalis and alkaline salts, as well as neutral and acid salts is very broad. With many organic compounds Haveg 1810 is completely satisfactory. Write for complete data.

OPERATING TEMPERATURES for most Haveg 1810 equipment is conservatively rated at 150°F. Remember, the complete line of Haveg equipment, including items using phenolic, furan, epoxy, polyester resins, now covers a working temperature range from 150 to 360°F.

WRITE FOR NEW HAVEG 1810 CATALOG which describes this new construction material, gives sizes and corrosion resistance information. Haveg gives you: Custom PVC fabrication. Complete stocks of standard items. Experienced corrosion engineering service. Design, engineering and installation skill. Call the Haveg engineer listed!

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WESTFIELD, N. J., Westfield 2-7383

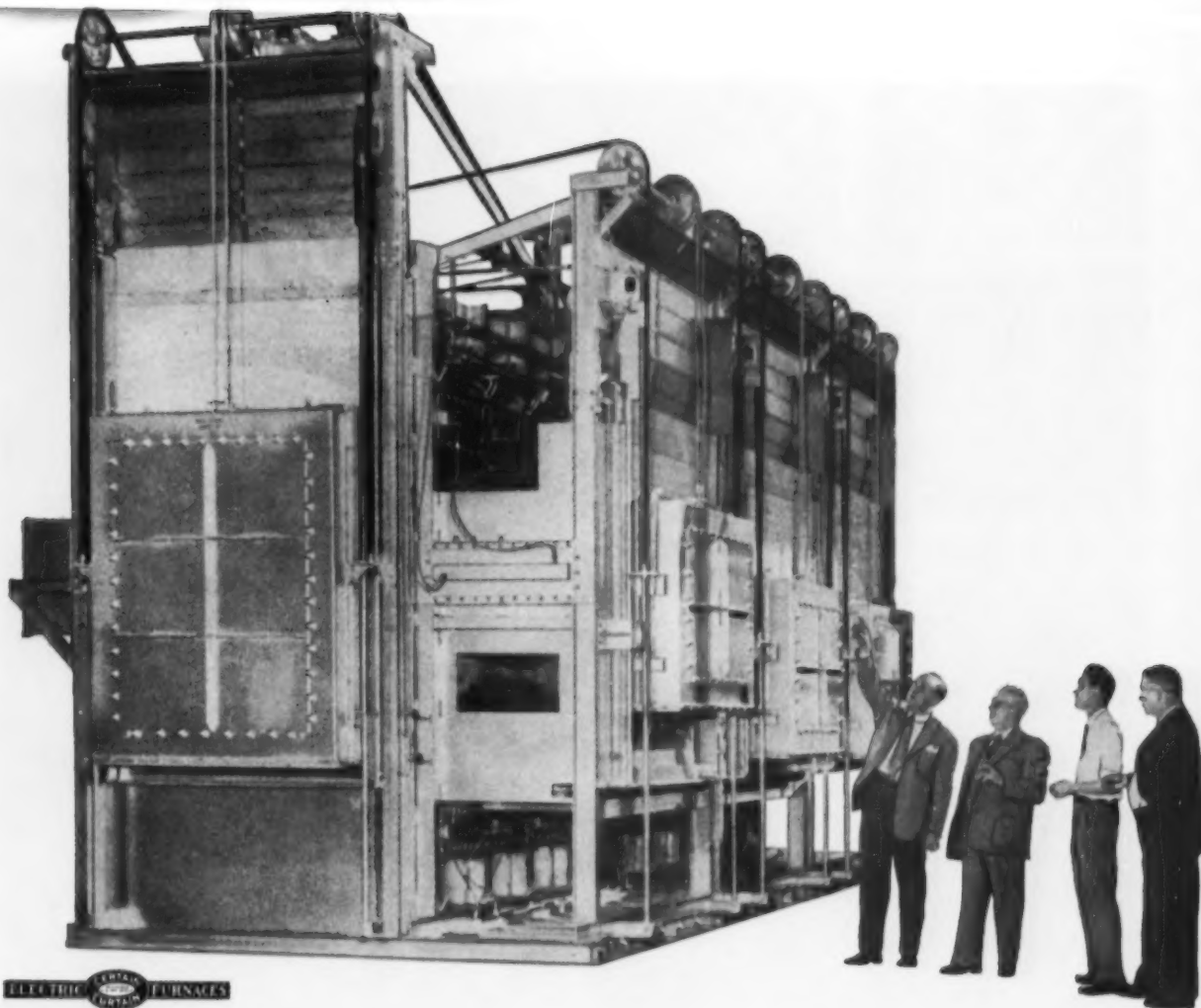


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CORPORATION
NEWARK 7, DELAWARE

FACTORY: WILMINGTON 8, DEL. • Wilmington 3-8884

A SUBSIDIARY OF CONTINENTAL DIAMOND FIBRE CO.



ELECTRIC FURNACES

SUPER REFRACTORIES REDUCE WEIGHT AND GIVE FAST HEAT-UP OF world's largest electric steel forging furnace

Interior of heating chamber. It will accommodate 10,000-lb. steel forgings. The GLOBAR heating units and the CARBOFRAX hearth and piers had not yet been installed when this photo was taken.

The world's largest controlled atmosphere electric steel forging furnace was recently shipped from the Cranston, R. I. plant of C. I. Hayes, Inc. The big furnace is 17 feet high, 13 feet wide and 25 feet long over-all. It uses 45 GLOBAR® silicon carbide heating elements drawing 600 kilowatts to provide operating temperatures in the 2200°-to-2400°F. range. It will be used to supply billets up to 16 feet in length and 10,000 lbs. in weight for hot forging on a 50,000-ton press, one of the largest in existence.

C. I. Hayes used a carefully-worked-out combination of CARBORUNDUM Super Refractories to keep weight low and cut heat absorption of the lining to a minimum with greatest possible service life under working conditions:

A CARBOFRAX® silicon carbide hearth provides high thermal conductivity, abrasion-resistance, and load-carrying ability at the 2300°F. work chamber temperature.

CARBOFRAX piers have so much hot strength that they can be light and slender yet still furnish adequate support for the heavy furnace charges.

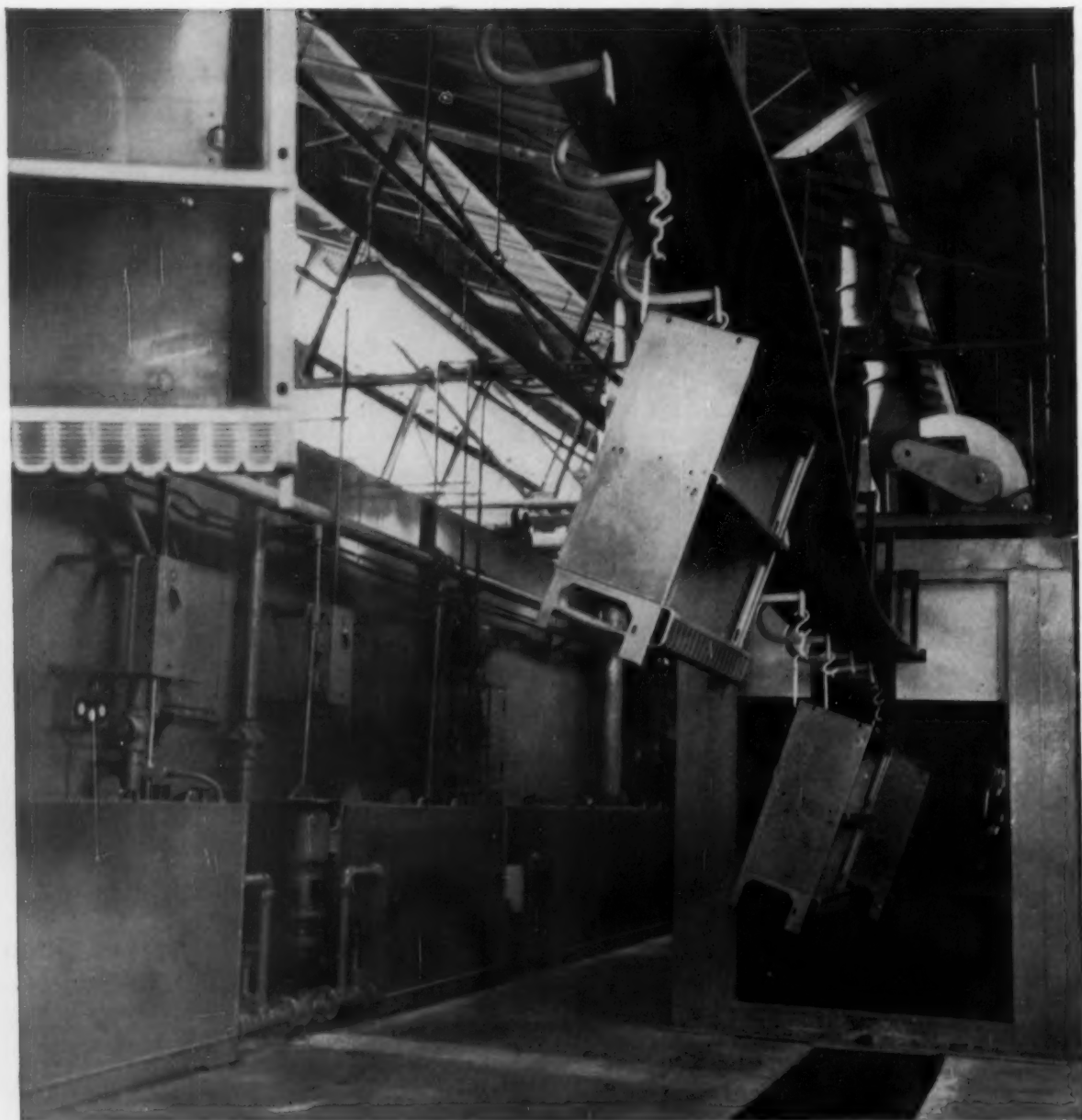
MULLFRAX® W electric furnace mullite skewers are nonspalling and provide excellent load-carrying strength at high temperatures, with low heat conductivity.

ALFRAX® BI aluminum oxide brick are used for the sidewalls and roof. One of the most effective of all insulating materials for very high temperatures, these ALFRAX materials keep heat costs down; are light in weight, nonspalling and highly refractory.

This arrangement of C. BORUNDUM refractory materials gives the big furnace low heat storage and fast heating . . . is economical to operate and maintain. These Super Refractories can improve your furnaces in the same way. Why not check up on them now? Write Refractories Division, The Carborundum Company, Perth Amboy, N. J., Dept. B65.

CARBORUNDUM

Registered Trade Mark



AMERICAN INDUSTRY IMPROVES PRODUCTION...THANKS TO *GAS*

This is a gas-fired drying oven at the John J. Nesbitt Company in Philadelphia. The Company manufactures heating, ventilating and air-conditioning products, ranging from baseboard radiation to large volume blower fan units. This oven is one of the largest of its type in the country. It can take pieces up to 10 feet long on an overhead conveyor. Each can be painted a different color without interrupting the flow of the production line.

Throughout the entire process at Nesbitt's, Gas is installed as part of the line. The flexibility of Gas allows

close temperature control in a series of chemical baths and rinses preceding the drying and paint-baking process, and without expensive heat-up periods. The dry-off oven is ready in just 10 minutes, and the paint bake oven is ready in less than 25. Gas is used because it is faster, cleaner, and keeps operating costs down.

The John J. Nesbitt Company finds Gas the most satisfactory method of heat processing for its operation. That's reason enough for you to discuss your problem with your Gas Company's industrial specialist.

American Gas Association.



Use one or more of these **"CONTROLLED-AIR-POWER"** Devices to open the door to **BETTER • SAFER • LOWER COST PRODUCTION**

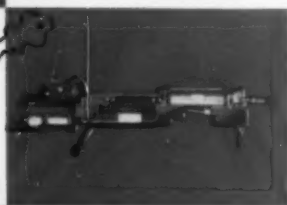


THE BELLOWS AIR MOTOR

The Bellows Air Motor is an integral power unit complete in itself. There are no extra valves to buy. Only one air connection is required. Integral construction means instant piston response to the valve. No lag—no delay. Built-in speed controls assure positive control of piston rod speeds in both directions.

DRILL PRESS FEED

Mounts on any standard drill press in 30 minutes. At a touch on the control lever the cutting tool rapidly advances to the work, moves through the work at correct rate and pressure, and automatically returns to starting position.



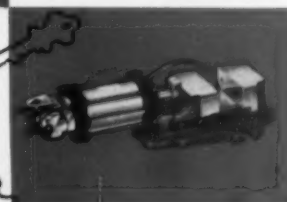
BELLOWS-LOCKE DRILL

A rugged, flexible unit combining electrically driven spindle with rapid, air-powered traverse and hydraulic feed control for peak efficiency drilling. Independent speed controls. Thrust equals 3 times applied air pressure. Stroke length adjusts 0" to 3".



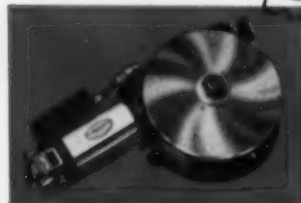
AIR VISES

Flexible semi-automatic holding units to reduce costly "hand time". Light duty unit shown has 4" jaws, opens to 2 1/4", clamping pressures to 1000 lbs. Heavy duty vises available with clamping force up to 15,000 lbs.



ROTARY WORK FEEDERS

For fast, accurate feeding of work to tools. Work is done at one or more stations as operator loads and unloads at another. Inter-cycle idle machine time reduced 50% or more. All models include built-in speed controls, impulse switch for interlock to other machine elements.



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The heart of these Packaged Work Units is the Bellows Air Motor—the air cylinder with built-in valve and speed controls. A versatile precision work unit complete in itself, the Bellows Air Motor can help cut costs in your shop. Send for additional information.

Write for Bulletin CL-50, address The Bellows Co., Akron 9, Ohio, Dept. 1A655.



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"OPERATION PUSHBUTTON"?

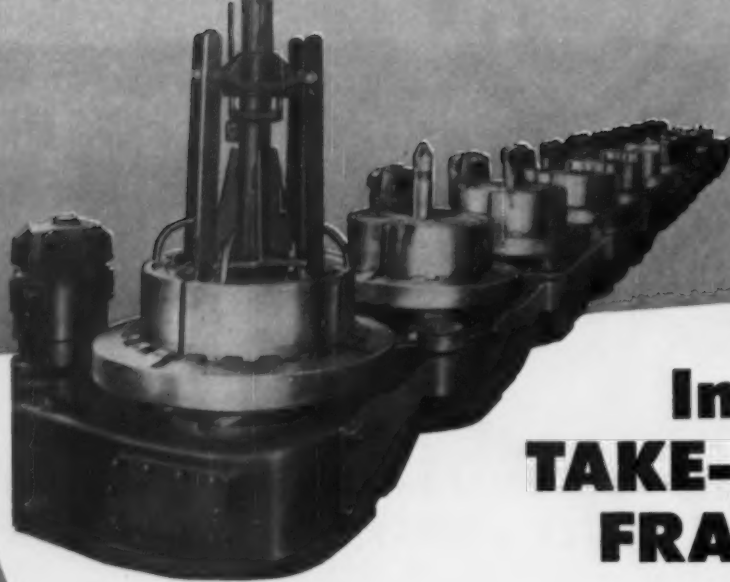
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Akron 9, Ohio

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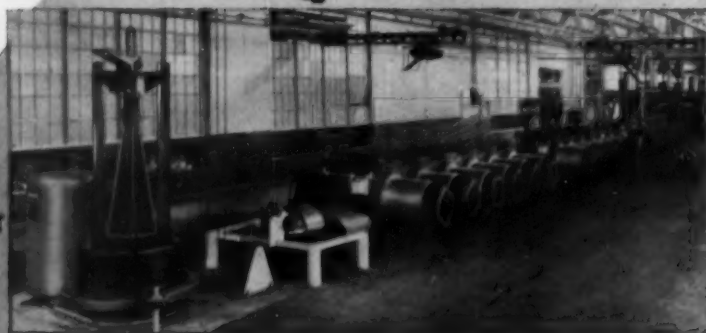
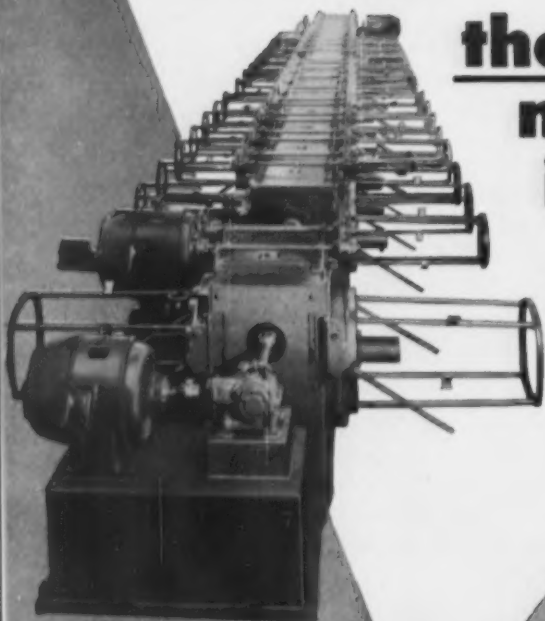
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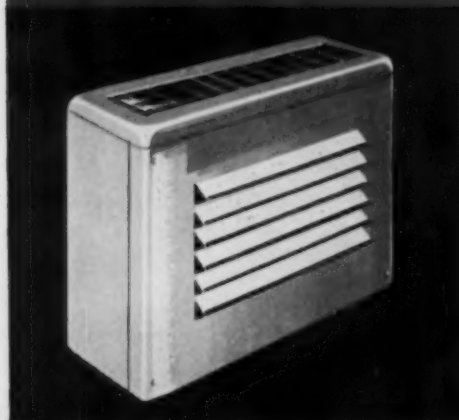
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STAINLESS: Where Are Its Markets?

Use of stainless will grow tremendously in next 10 years, but its biggest growth potential is in the home . . . Skyscrapers are spectacular, but doorknobs are bigger . . . May set shipment record in '55—By J. B. Delaney

♦ IF YOU'RE among some 3500 fabricators of stainless steel you can look for a tremendous gain in business during the next 5 to 10 years. But it would be a good idea to figure on the direction this growth will take and plan accordingly. If you're not in the field it might pay to look into it further.

A market analysis just completed by THE IRON AGE shows at least seven areas which have outstanding growth potential. They include architectural, aircraft, atomic energy, automotive, agricultural implements, highways and last—but most important—the American home market.

Meanwhile there's a very good chance that 1955 stainless steel shipments will break all records. Previous record year was 1953, when stainless producers shipped 601,708 net tons; 1954 was off to 452,351. But a conservative IRON AGE estimate puts the 1955 total at 605,000 tons. (See chart). Most stainless products are booked solidly for the balance of this year though there is still some plate space open.

Market in Windows

Most spectacular of the growing stainless applications is in the architectural field. In relation to total sales this is now a rather small field, though it has shown a 300 pct increase in the past 5 years. Outer skin, such as that now going up on the huge Socony Vacuum building in New York's Grand Central district, is an eye catcher. But most stainless market authorities don't figure this as a major building use. They seem more optimistic about gains in

hardware: doors and door knobs, kick plates, parapets and canopies. And windows. Windows may be the biggest architectural application.

There are now three stainless windows on the market which producers claim are really competitive with aluminum. They say they don't cost any more than a good aluminum window. Stainless producers appear less excited about the possibilities in monumental buildings than they are on prospects for the smaller units.

The automotive gas turbine market appears to be at least 5

years away. That is, it will likely be that long before such a unit could appear in a high production car. But here is a tremendous market indeed for stainless. Though the application is now suffering from much the same growing pains that plagued early aircraft turbine work, it is a fact that there have been no automotive turbine material failures in tests run to date.

But the automotive market is one that keeps stainless producers constantly worried. Here the applications are now ornamental, not functional. Those who sell

Stainless Steel Shipments (thousands of tons)



*Iron Age Estimate

stainless are at the mercy of the whims of the buying public—or even the design engineers who could conceivably legislate it off the new cars if they thought the public wanted a change. And aluminum is a definite threat, made huge gains on the '55 models. And when aluminum is available in non-fading colors, automakers are likely to swing heavily to it. Plastics and diecastings also hold a threat to stainless trim in this field.

Aircraft Use Grows

The foreseeable future of stainless aircraft wings is in military rather than commercial craft. Reason is that stainless' heat resistance makes it encouraging for wings of supersonic planes and missiles. Applications tried so far have been primarily on leading edges. Here, of course, it will run into stiff competition from titanium. Although stainless would seem too heavy for aircraft wings, current research is being directed

toward expanding the metal, then welding a light sheet to the outer surface wing.

Farm Market

The agricultural implement field is being eyed by stainless producers. One major implement manufacturer would go into production of items such as spread-

ers, tanks and feeders if he could get stainless for 25¢ a pound. As far as stainless producers are concerned, this isn't in the cards; they say that if another 10¢ could be added they'd be in business. Idea is that implements like this are usually exposed to the elements, would last a lot longer in a non-corrosive metal. But there may be a swing here if the trend to liquid fertilizers grows; it would be ideal for phosphoric acid tanks.



STAINLESS steel has found many applications in the drug industry. These vessels of Allegheny Ludlum stainless may be used for polio vaccine.

IRON & STEEL: APRIL OUTPUT BY DISTRICTS

As Reported to the American Iron and Steel Institute

BLAST FURNACE—		PIG IRON		FERROMANG. & SPIEGEL		TOTAL			
NET TONS								Pct of Capacity	
DISTRICTS	Annual Capacity	April	Year to Date	April	Year to Date	April	Year to Date	April	Year to Date
Eastern	17,456,190	1,305,993	4,950,200	28,611	103,620	1,334,514	4,953,988	92.9	86.3
Pitts.-Vngtn.	29,931,670	2,236,882	8,388,347	19,677	69,173	2,286,539	8,457,520	91.6	85.9
Cleve.-Detroit	9,962,600	752,539	2,982,219			752,539	2,982,219	94.4	89.6
Chicago	16,431,080	1,294,020	4,999,475			1,294,020	4,999,475	95.7	92.5
Southern	6,419,080	481,160	1,715,642	8,424	22,393	487,584	1,738,235	86.6	82.3
Western	4,045,680	299,436	1,124,277			299,435	1,124,277	87.1	84.6
TOTAL	83,971,190	6,329,927	23,926,420	64,712	215,192	6,394,639	24,135,612	92.4	87.4

STEEL—		TOTAL STEEL		Pct of Capacity		Index**		ALLOY STEEL*	
NET TONS									
DISTRICTS	Annual Capacity	April	Year to Date	April	Year to Date	April	Year to Date	April	Year to Date
Eastern	76,487,090	2,063,626	7,776,406	94.7	89.3	163.8	144.9	122,720	472,239
Pitts.-Vngtn.	44,342,030	3,431,040	12,993,361	94.0	89.1	175.1	118.4	507,514	1,904,567
Cleve.-Detroit	13,024,000	1,017,727	3,981,941	95.0	90.9	172.0	164.4	98,793	359,167
Chicago	27,852,790	2,226,960	8,386,826	97.2	91.5	147.9	139.2	134,956	517,417
Southern	7,093,430	508,046	1,962,371	90.1	84.1	186.0	145.5	4,823	22,534
Western	7,028,470	549,680	2,126,612	95.1	91.7	151.0	145.6	12,872	49,490
TOTAL	125,826,310	9,816,066	37,131,619	94.8	89.7	142.6	134.6	671,676	3,386,712

* Included under Total Steel.

** Based on average production of the three years 1947 through 1949 as 100.

† Revised.

Highways Take More

Also in the agricultural field is a big market which fabricators of stainless milk cans are trying to crack. Some 67 million tons of milk were processed last year by about a million dairy farmers. Market experts figure that some 500,000 of these should be persuaded to convert to stainless at an average cost of \$2000 to \$4000 per setup. Total stainless prospect here: 500,000 tons.

Rapid growth in highway building offers some interesting prospects for guard rails, cables, nuts and bolts and for reinforcing material in inaccessible places.

Two fields that appear to have a tremendous growth potential are in home appliances and atomic energy. The former could really be tremendous. Producers are eyeing the growing use of stainless

sinks, refrigerator doors, wall ovens, even see possibilities in garbage cans. They also predict more competition with silver in the cutlery field. However, despite great improvements in design and finish, it will probably take a big campaign to overcome Mrs. America's traditional liking for sterling silver.

Nickel Stays Short

Another area where possibilities must be checked carefully is color television tubes. Black and white TV tubes gave stainless a big push, then tube makers switched to cold rolled steel; most have since gone over to glass. In color TV the start was on stainless but at least one top manufacturer is already planning to convert to cold rolled steel to save some \$6 to \$7 a tube.

The nickel supply situation continues to worry stainless steel producers who have now asked that allocations be put on a quarterly, instead of a monthly basis, so they can plan better. There has of course been a trend toward using lower nickel stainless types. The nickel people are also worried about the supply situation. Their fear is that recurring shortages, caused in part by stockpiling, may scare too many people away from nickel stainless and alloy steels—wind up in an oversupply of nickel. The balance lies somewhere between these extremes.



"It's too wet to fix it now and when it's dry it doesn't need it."

June 16, 1955

MATERIALS HANDLING

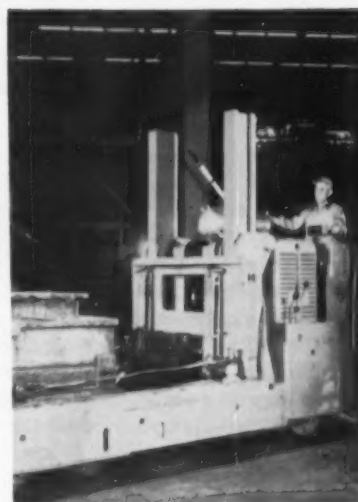
Truck Speeds Die Changing

♦ **COSTLY** aircraft press time is being reduced at Lockheed Aircraft, Burbank, Calif., with specially built hydraulic die-handling trucks. Bulky kirksite dies up to 12 ft long are consistently changed in 5 minutes.

Handling kirksite die over 12 ft long, the new trucks take just 8 minutes for an operation that includes hauling from storage yard to press bed, pushing into the bed and turning die 90° during the pushing.

The new trucks, made by Elwell-Parker Electric Co. of Cleveland, are equipped with a hydraulic push-pull mechanism consisting of a pair of cylinders built into either side of the truck's platform. A departure from the previously standard cable winch type mechanism, the pusher cylinders can be operated simultaneously or independently, permitting jockeying of the die as it is pushed into position. An added advantage of hydraulics is the precise control or "winching" action made possible when the hydraulic control valves are barely cracked open.

Since the pusher arms work directly against the die, it is unnecessary to rig cables to push a die off the platform and only two short



CABLES pull die onto platform of new truck in fast press change.

sections of cable are required to pull the die on. Pusher rams permit pushing beyond the end of the platform.

Compact design enables truck to work in crowded areas and narrow aisles. Stand-up operation eliminates climbing for driver, who works pusher controls from a forward position at the side of the truck. Units have solid rubber tires with rear-wheel steering.



HYDRAULIC pushers of special Elwell-Parker truck work at odd angle to turn big die 90° and push it onto press at Lockheed Aircraft, Burbank.

DETROIT: Can It Learn to Love GAW?

Industry gets ready to live with it despite reservations . . . Not all labor happy . . . GM proves tougher negotiator . . . Costs are also competitive in the industry . . . Legality is believed assured.

♦ **EVEN AS** General Motors and the United Auto Workers fought out their contract down to the last comma, the rest of the industry got ready to live with a guaranteed wage principle.

And if many on the management side had reservations about the wisdom of the pattern set by Ford, they had company because not all of labor's approved of the Ford-UAW agreement.

For more on the auto labor situation see p. 7 and p. 57.

Walkouts that upset Ford's operations for a full week following the settlement were clear evidence of that, although protests died a natural death shortly thereafter.

"Reuther says we got 20¢, but where is it?" was the attitude of many of the workers at the mammoth Rouge plant, Ford's home

grounds. It was obvious a lot of them hadn't swallowed Walter Reuther's jubilant "best ever" claim.

Ford Prepared

The UAW was determined to hammer out a better settlement from GM but ran up against tougher resistance there than at Ford, where the company had its plan prepared in advance and carried it into negotiations.

When the initial offer of stock at half price was turned down, John Bugas, Ford's vice-president in charge of industrial relations, just reached into his hip pocket and produced the 26-week supplementary compensation plan. This, with other fringe benefits was accepted with little struggle or change.

Legal problems were raised on the point of whether a worker could receive state unemployment compensation and supplementary pay, a practice that is specifically

banned in several states. But few governors or legislators will hesitate to amend state laws and the problem was pretty much brushed aside by management and labor.

Pool GAW

Chrysler will follow along in the pattern set by Ford and GM, but the issue is uncertain regarding the independents.

George Romney, president of American Motors, stated previously that his company did not intend to follow a pattern, that its economic problems are different from the Big Three and should be treated that way in labor negotiations.

The UAW has suggested that smaller companies "pool" their guaranteed annual wage plans, an idea that seems impractical. Independents will have to make some concessions to employment stability in the face of the pattern now established, but a different form is possible.

Contract settlement by Ford further chilled the already cool Ford-GM relationship. There is no doubt that Ford's speedy capitulation was prompted by the company's determination to beat Chevrolet.

It is apparent that Mr. Bugas was instructed to bargain aggressively, but to avoid a strike at all costs. Attitudes at negotiation's end showed the settlement was well within limits Ford had set prior to negotiations.

This was not the situation at General Motors, which was firmly opposed to the GAW in principle and would have been much tougher if negotiating without the Ford agreement in front of it.

For the first time, it was Ford that set the pattern, whereas in the past GM set the pace.

A "Bitter Pill" for General Motors

■ Harry M. Anderson, vice-president of General Motors, described his company's modified guaranteed wage agreement with the United Auto Workers as "a bitter pill to swallow." He congratulated the UAW on its strategy in winning GAW from Ford first, intimating that GM accepted it only because its chief competitor had thus put GM on the spot.

■ Principal provisions of the GM-UAW agreement parallel those of the pace-setting Ford settlement. Both agreements will run for 3 years. UAW estimates the "package" will cost GM over 20 cents an hour, or \$600 million for the three years.

■ The GAW provisions of the GM contract require GM to contribute 5 cents an hour to provide workers with 60-65 pct of take-home pay for as long as 26 weeks in event of layoff. GM will build up a fund of \$150 million to guarantee payments for its 375,000 hourly workers.

■ GM also signed a similar agreement for 35,000 workers represented by the CIO United Electrical Workers union.

STEEL: Walkout Too Close For Comfort

Union demands were stepped up after Ford settlement . . . Dave McDonald must strengthen his prestige . . . Steel companies will also act tough to keep price increases at a minimum—By Tom Campbell.

♦ THERE WON'T be any steel strike this year. But before settlement is reached the union will come mighty close to a walkout. Down-to-earth bargaining will begin this week or next. What has happened to date has been window dressing for public consumption.

Those photographs showing happy union and steel people covered very well the worriment that both sides are keeping to themselves. Some of these brow-wrinklers are: Is the union afraid it won't get a big enough wage increase to offset the auto agreement? How many offers will the union have to turn down before it picks up U. S. Steel's final offer?

Unions Compete

Steel firms have their fears and troubles too. It is no secret that most of them were stunned by the liberality and the thinking behind the Ford agreement. Will they face the same kind of a demand next year? If they do, how will they meet it? And what will they have to do this year to prevent a strike and mollify the union at least temporarily?

Even though steel officials decry the competition between the steel and auto unions, they know it is a factor in their bargaining sessions. It is a much stronger one this year—because of the guaranteed wage concession, the 6¢-an-hour annual productivity boost and the revision in the built-in cost of living protection; to say nothing of the substantial gain in pension payments.

The steel union has to get a big settlement this year because auto-workers got theirs; because steel business is booming; because the steel union missed the economic boat last year when it got a small raise in hourly pay, and finally because Dave McDonald, steel union

president, needs additional prestige this year.

15¢ Possible

Steel companies must resist a big wage boost as strongly as possible because sooner or later they will have GAW rammed down their throats; because they don't want to raise steel prices too high; because a lot of money must be spent for increased capacity over the next few years and because the steel industry must keep its earnings as high as possible in order to attract risk capital.

But when all is said and done, the union is in the driver's seat this year. Steel people have conceded this privately—and have been called to task by some of their own members for making such a concession even in private. In recent weeks there have been incautious estimates within private steel circles that the settlement may call for a 15¢-an-hour wage increase. More than a few steel executives

have become increasingly worried about this speculation which as always started within the industry, rather than coming from labor.

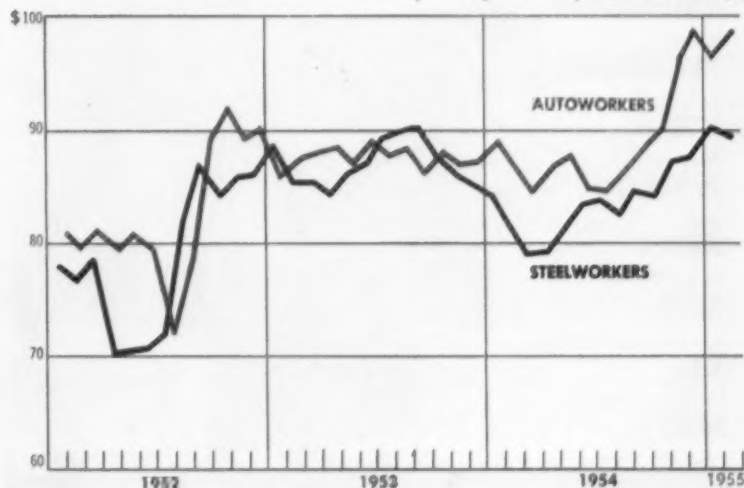
Hood vs. McDonald

The steel union will try to knock over U. S. Steel first and will expect other steel firms to follow. While negotiations are going on, among several companies and the union, it is not expected that any steel company will walk up front until it sees what U. S. Steel is going to do. Clifford F. Hood, U. S. Steel president, has taken over from Mr. Fairless, former chairman, the guiding post in negotiations with the union. He will be a good match for Mr. McDonald and will drive as hard a bargain as possible in the final stages.

Another factor which always lurks in the background: The steel industry wants things to go as well as possible with Dave McDonald in his tug-of-war with Walter Reuther's automotive union.

Steel, Auto Paychecks

(Average Weekly Gross Earnings)



TAMPINGS: Mid-West Market Looks Up

Recent survey cites bright future for metal stampers in Kansas City, nearby areas . . . There's an annual market of over \$100 million . . . Raw materials, skilled labor readily available.

◆ **THERE'S** a big new market for metal stamping plants opening up in the Midwest—specifically in Kansas, Missouri, Iowa, Nebraska and Oklahoma.

Tipoff comes from a recent survey compiled by Midwest Research Institute which cites these guideposts: (1) there's an annual stampings market worth more than \$100 million, (2) consumers include a wide range of expanding industries, (3) raw materials are readily available as are skilled labor and good plant locations.

Commercial stampings in the region amounted to \$37 million in 1953, while consumption ran to \$100 million. These figures do not include "captive" stampings made and consumed in the same plant. This means in terms of dollars, stampings consumption in the area outstripped production by \$67 million.

On a national basis, the region

produced 1.7 pct of total U. S. output and consumed 4.6 pct. Figures include many types of stampings.

For example, area consumption of auto job stampings amounted to \$22.6 million—as against \$977.5 million consumed nationally. While few auto job stampings were produced locally, production of household stampings—for which \$22.3 million was spent as against \$210.6 million nationwide—was fairly well represented in the area.

Automotive Heads List

Considered by broad industry classes, leading area stampings consumers were headed by automotive and households, followed by non-electrical machinery, aircraft, food products, electrical machinery and non-classified fabricated metal products.

Auto consumers include large

body assemblers such as General Motors and Ford in Kansas City and St. Louis. About 2.3 pct of the country's production of auto job stampings is consumed in the area. Area production of auto job stampings is very limited.

The \$22.3 million household stampings market includes stamped and spun utensils, pails, ash cans and home canning closures. On the basis of population and retail sales estimates, Institute researchers look for a steady rise in this market.

Regional expenditures for non-auto job stampings came to \$36.3 million compared with \$547.8 million spent nationwide.

The survey notes that the outlook for stampings consumption is especially bright in the farm machinery and tractor fields. A solid market is also seen among aircraft consumers where consumption is about evenly divided between finished assembly and parts manufacture.

In general, freight costs on materials are considered a minor factor in the area's stampings industry. Transportation charges on sheet metal are typically no more than 1 to 1½ pct of the finished product in the area.

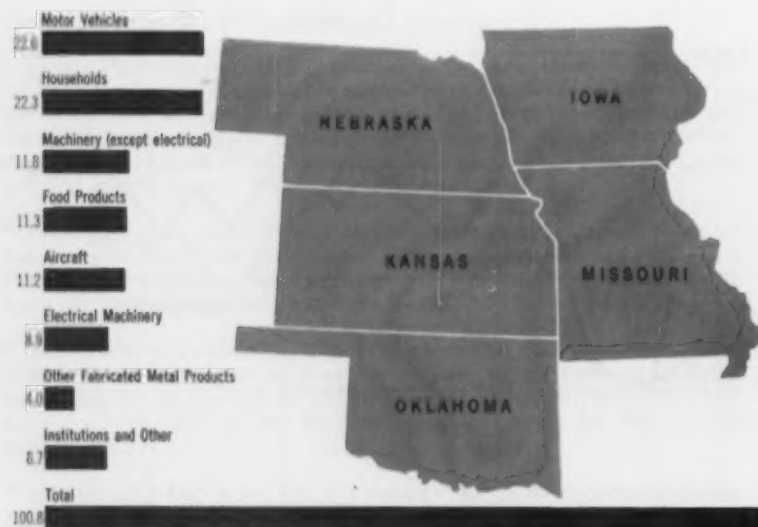
Spotlight on Kansas City

Focusing attention on Kansas City as the centre of the region studied, the report states that adequate wholesale facilities exist for consumers who want to buy steel and aluminum sheet in less than carload lots—or who do not want to do their own warehousing.

From 1947-'53, the city's manufacturing labor force grew from 78,000 to 120,000 workers—an increase of 57 pct. A large reserve of skilled and potentially skilled labor resides in nearby towns.

Who Uses Stampings?

(Consumption in millions of dollars in 5 state area)



MILLING: It's Done With Electronics

Giddings & Lewis develops skin milling machine with "brain" and a "memory" . . . Single tape recording will operate machine for slightly over one hour . . . Machining time savings noted—By K. W. Bennett.

◆ **NOW:** an aircraft skin milling machine with an electronic brain, a magnetic memory, and the capability of telling its operator in firm tones what it needs next.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has pulled the wraps from a skin miller that represents four years' development, and the combined brainwork of Giddings & Lewis, Massachusetts Institute of Technology, and General Electric.

The 40 ft long, 20 ft wide skin miller mounts two heads revolving at 3600 rpm and capable of a 120 in. per minute cut, or 450 cu in. per minute. These are the official figures. Unofficially, users of similar equipment at the meeting were mentioning speeds of as much as 150 in. per minute. The unit is scheduled for military skin milling, but at least one civilian application is on the fire. Designers of the "brain and memory" unit were indicating at least the possibility of using similar equipment for automotive die work.

Tapes Perform Magic

The "brain" is a numerical director. A manuscript giving data for the part to be milled is prepared by an engineer. A clerk-typist takes over, punches the data on a paper tape using a 16 key keyboard. A copy of the punched data is prepared simultaneously for checking against the original manuscript. The paper tape feeds into a second unit which prepares a magnetic tape. A single magnetic tape "recording" fed into the control unit will operate the skin miller for slightly over one hour, is stored on reels holding 4800 ft of tape.

The tape carries 14 channels. Electronic orders can range from adjusting cutter height to shut-

ting off coolant flow, from bringing the second cutter head to bear, to the engineer's voice telling the machine operator that at this phase of the cutting operation it is about time to replace the cutter.

Utilizing about four closets full of electronic equipment, the tape guided skin miller is capable of five simultaneous machine motions, with 22 separate auxiliary functions (lubrication, coolant flow, chip conveyor, for instance) responding automatically. The machine will run through the entire milling operation for one hour or can be set to halt automatically at the conclusion of each pass to allow visual inspection of the workpiece.

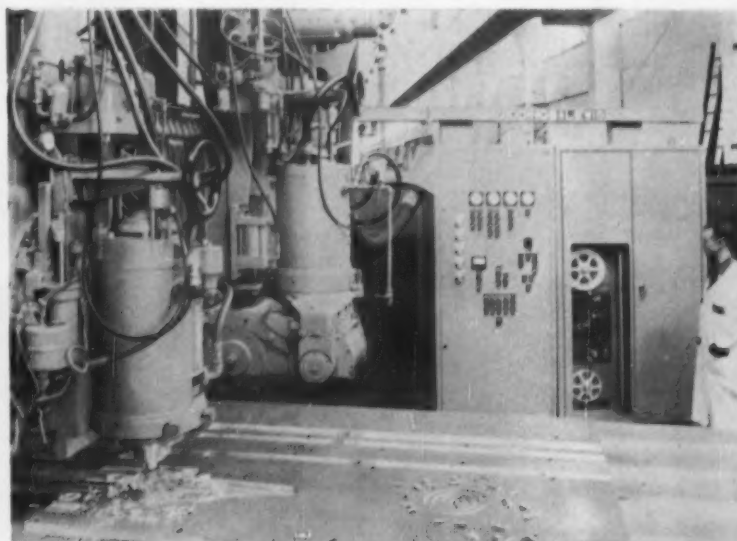
Official name for the guidance system is Giddings & Lewis Numericord. It means that an engineer in Boston can prepare a tape on a numerical director, have the

tape flown to the West Coast, and production begun immediately on receipt of the tape.

Machining Time Savings

The Giddings & Lewis machine is capable of operating from the tape, or from conventional templates. The templates could be used to make reference tapes and the templates can be eliminated. Similarly, an engineering change in the aircraft part being milled can be performed at a single plant, and tapes then be mailed to other plants building the same part with no need to prepare and ship templates. Some of the tape for the plant demonstration last week had been prepared at Boston and flown to the machine at Fond du Lac as a demonstration of the possibilities.

The present tool has its own numerical director and tape recording and playing mechanism.



NUMERICORD, a new aircraft skin milling machine, has human responses to tape recordings through its numerical director "brain."

SPENDING: Will Hit Record High

Bigger increase is coming . . . Third quarter outlays will hit \$28.8 billion, matching previous peak . . . New plant outlays have risen sharply this quarter . . . Gain is widespread.

◆ **RIGHT NOW** new plant and equipment expenditures are on the rise and the pickup will be even bigger in the third quarter. Spending rate is increasing so much, that second and third quarter totals will match previous all-time highs.

This is a drastic switch from the pattern earlier in the year, when a lot of businessmen were still playing it close to the vest. Previous

government surveys showed that industrial and business firms intended to spend about \$2 billion less on new plant and equipment this year than in '54, and outlays during the first quarter were running at only a \$25.6 billion per year rate.

But now, based on reports of capital expenditures in April and May, the spending rate for second

quarter is moving at a \$27.9 billion per year pace and third quarter should hit around a \$28.8 billion per year clip.

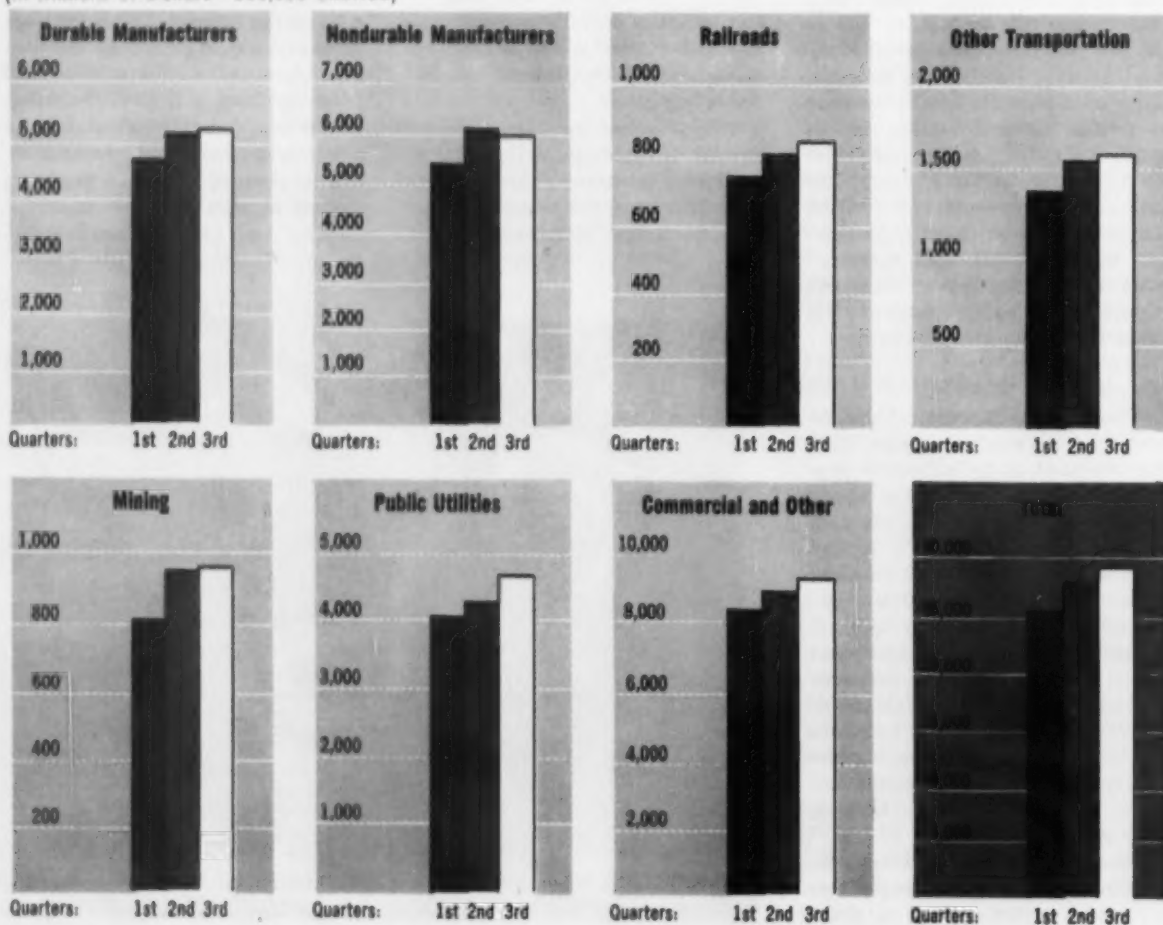
Rate of expenditure in the third quarter of this year will match the peak reached in the third quarter of 1953. If planned programs are carried out, capital outlays for the first three quarters of 1955 will be moderately above the corresponding period of 1954.

Recent government survey indicates that all major industries have scheduled sizable increases in capital investment since the first quarter. However, spending rate for manufacturers in the first 9 months of this year will be slightly below the 1954 rate. Third quarter outlays, however, will be greater than third quarter '54.

Biggest spending will be by steel, metal, transport industries.

New Plant & Equipment Expenditures by Industries

(In Millions of Dollars—000,000 omitted)



COAL: Pipelines May Save Markets

Ohio pipeline will transport coal from mine to consumer . . . High transportation costs will be slashed . . . Project may show way to new idea of materials handling over long distances—By W. G. Brookfield.

♦ TRANSPORTATION of coal, ores and similar solids by a new method might eventually develop into an entirely new concept of material handling over large distances.

A recent joint announcement by the Pittsburgh Consolidation Coal Co. and the Cleveland Electric Illuminating Co. revealed the plans to construct a 108 mile pipeline for the transportation of coal. The pipeline will extend from the coal company's Georgetown, O., properties to the Eastlake, O., plant of Cleveland Electric.

Beats Cost

While other small lines have been attempted in the past, this will be the first commercial coal line in the U. S. The earliest known attempt to transport coal through a pipeline was in 1880. This venture tried unsuccessfully to transport coal from barges in the harbor to the consumption point near the heart of New York City. Other attempts, some meeting with moderate success, were tried over short distances between local points near the mines.

Probably more significant than the pipeline itself is that it is one of the first positive steps by an industry to combat high transportation costs of its products. The successful operation of this pipeline could very well open the door for other pipelines and other similar methods of automatic transportation.

Other types of transportation include the cross-country conveyor and the automatic, electronically operated railroad. At the moment, the cross-country conveyor does not enjoy the right of eminent domain in all areas, but future demands for coal and ore may change this situation. The



EXPERIMENTAL PIPELINE sections test flow of coal slurry in different planes. Are forerunners of new line being constructed through Ohio.

cost of right of way for an electronically operated railroad would mean that an assured demand for a tremendous quantity of ore or coal would be necessary before construction would be practical. This demand would have to exceed by many times the quantity of coal to be handled by this first pipeline.

The pipeline will deliver 1,200,000 tons of coal per year over a fifteen year period under the terms of the present contract.

The pipeline is 10¾ in. in diameter and transports the coal at approximately three miles per hour by means of three pumps spaced equally over the pipeline. The coal is mixed 50-50 with water to form a slurry before entering the pipeline. This is, in turn, dried out when it reaches its destination.

An interesting sidelight of this development is the participation of three railroads in the undertaking, each of which is now handling coal between the two points. The New York Central, the Nickel Plate, and the Pennsylvania will continue to transport the bulk of coal from the Georgetown operations and also all additional re-

quirements necessary for the operation of the electric plant. When the pipeline is completed, each of the railroads is in a position to take substantial ownership of this new means of transportation.

Sell Titanium Report

Harmful effects produced by hydrogen on titanium and titanium alloys are reported in a new publication now being sold by the Office of Technical Services.

Research performed at the Wright Air Development Center in Ohio shows hydrogen contamination in alpha-beta titanium alloys can cause low ductility. This contamination also makes the alloys more susceptible to brittleness as a result of exposure to stress and increased temperature.

The 185-page study indicates the likelihood of producing alloys with much higher tolerances for hydrogen.

Priced at \$4.75, the report is "Hydrogen Contamination In Titanium and Titanium Alloys, Part I, Hydrogen Embrittlement in Alpha-Beta Titanium Alloys." Its order number is PB 111620.

TRUST BUSTERS: Out After Scalps

Hearings show strong move to break up big companies . . . Justice Dept. wants merger controls, eyes GM auto grip . . . Chrysler head blasts charges of competition restraint—By N. R. Regeimbal.

♦ DIRECTION of current trust-busting sentiment in Washington is becoming clear as representatives of the steel and auto industries take their places at congressional witness tables—bust up the giants, if possible; clamp tight new restriction on future size and integration.

Whether or not any concrete new laws will be molded out of the heat of present feeling, either this year or in 1956, remains to be seen. But politicians looking for ammunition are convinced that the climate for new trust-busting legislation is the best it has been in recent years.

Most important proposal in the hearings thus far is probably one made by Judge Stanley N. Barnes, tough chief of the Justice Department's antitrust division. He urges that a new law be passed to require business firms to notify the government of merger plans.

This suggestion has been hanging in the smoke of committee hearing rooms for weeks as two separate subcommittees have been chewing on the antitrust problem. But only last week did Judge Barnes make the formal request for legislation.

Frequently proposed by some lawmakers is that new laws are needed to permit the government to break up large auto, steel, electrical-electronic and similar manufacturing firms into smaller units to "enhance competition." Another suggestion is that laws may be needed to prohibit an integrated producer, such as General Motors, from charging itself less for components than it charges competing firms who must buy from it.

This proposal is being tagged with a national defense label, as are many of the trust-busting ideas currently knocking around. Last week, at a hearing of the Sen-

ate antitrust subcommittee, Sen. Estes Kefauver, D., Tenn., an ardent trustbuster, coldly attacked the auto industry in questioning L. L. Colbert, President of Chrysler Corp., the first auto industry witness.

The Tennessean particularly referred to two recent tank contract awards, one of which went to GM and the other to Chrysler, in which an Allison transmission, made by GM, was specified.

Heat on GM

Mr. Colbert retorted that Chrysler buys from some 8000 independent suppliers. "If there's not competition in the auto industry, I don't know where there is competition," he said.

Judge Barnes, meanwhile, told the same committee that the Justice Dept. believes General Motors is on the brink of illegal monopolization of the auto industry, but doesn't plan any action at present.

He again defended the department's refusal to approve a planned merger between Youngstown Sheet and Tube and Bethlehem Steel Co. The proposed merger, he said, would eliminate competition between two firms in the same industry, and intensify the two-company concentration of the market.

Bill Backs Sales Tax

Companies buying materials to be used in completing federal projects will be clearly subject to state sales taxes if a bill now being examined by the Senate Government Operations Committee becomes law.

Introduced by Sen. Strom Thurmond, D., S. C., the measure is designed to permit the 32 states which levy sales taxes to collect those taxes from contractors.



CHRYSLER President L. L. Colbert testifies before the Senate Antitrust subcommittee in Washington. He said there's competition in autos.

WELDING: Show Sparks New Interest

Two million dollar exhibits show ways of making welds faster, cheaper, easier . . . Hand operation out . . . CO₂ welding stirs comment but viewers hold off final acceptance—By J. J. Obrzut.

♦ WELDING, that old art of joining metals, hit a new high in interest at the industry's third annual All-Welding Show. More than \$2 million worth of equipment was put through its paces in Kansas City's Municipal Auditorium to show midwesterners the latest in processes and materials.

The show, sponsored by the American Welding Society and held jointly with its Spring Technical Meeting, was better attended than were its predecessors. The welding industry, through its live exhibits, made it obvious that the day of hand operation will soon be coming to an end. More and more, equipment is being adapted to machinery to cut production costs.

Prospective buyers weren't taking anyone's word. They had to be shown—and they were—how these cost-cutting, production-boosting machines work. Exhibitors demonstrated new ways of making welds faster, cheaper and with less effort. To further whet buyers' appetites, exhibitors threw in some new wrinkles with their existing lines.

Here to Stay

CO₂ welding was the big conversation piece both on and off the floor. All the advance billing about saving anywhere from 60 to 80 pct in inert gas-shielded welding costs didn't seem to impress too many potential users. Even after the demonstrations, they took a "wait-and-see" attitude with the idea of getting the good word later from their own laboratories.

There seems to be little doubt that CO₂ welding is here to stay, but it will need more time to be evaluated further. So far, the process has been confined to sin-



MULTIPLE flame cutting of intricate shapes is demonstrated at Airco booth as crowd watches. An electric-eye tracing unit guides the torches.

gle pass welding. Procedures are being worked on to broaden its limits to the vertical and horizontal positions, and to multipass techniques. Also, there are a number of metallurgical problems to be worked out before the process can be used with assurance on applications which now appear highly promising.

Three firms exhibited equipment specially designed for the process. A. O. Smith Corp., which has been using the process in its own plants, has designed a welding head capable of feeding wire at rates from 6 to 600 in. per minute. To complete the package, it has also designed a control system and remote control panel for use with a constant current type power source.

General Electric introduced an automatic head and controls capable of feeding wire at speeds up to about 1000 in. per minute. This

equipment, also used with a constant current type power source, is designed to give a short arc length, reduces the amount of spatter.

Liquid Carbonic approaches CO₂ welding from another angle. Instead of using a consumable electrode, it has limited its work to the tungsten arc process in which an outer shield of CO₂ backs up an inner shield of argon or helium. Thus, the inner shield requires less of the more expensive inert gas.

Technical sessions were equally well attended. Papers — 41 of them—answered many problems faced by the industry. On the other hand, some raised new problems. For example, one dealt with the problem of repairing radioactive machinery. The special equipment which will be required for such repairs is seen as a real challenge.

Palace:

Plan \$100 million skyscraper over New York station.

Plans for a 500 ft skyscraper to sit on top of New York's Pennsylvania station were made known at the recent signing of a 1 year option agreement between the Pennsylvania Railroad and Palace of Progress, Inc., newly formed subsidiary of Webb and Knapp, Inc.

"Palace of Progress," as the proposed structure is called, would cost \$100 million and provide 7 million sq ft of floor space, making it the world's largest and costliest building. About 1.5 million sq ft are already earmarked for large buying organizations. If construction goes forward, the railroad will receive \$30 million.

Over \$500,000 has already been spent on research for the structure, which is pictured as a permanent world's fair and buying center. Billy Rose, famed showman, is

president of the building company.

Actual construction is contingent on successful solving of engineering problems without disrupting traffic and adjustment of city regulations to meet special problems involved in the huge building.

Overhead construction would be accompanied by modernization of station facilities to include an 18 ft air conditioned hall in place of the present waiting room.

Blast Furnace:

National Steel opens 30.3 ft giant at Great Lakes Corp.

Latest step in National Steel Corp.'s \$120 million plant development program was taken last week with the opening of a new 30-ft 3-in. hearth diam blast furnace at Great Lakes Steel Corp., Detroit.

Said to be the world's largest, the furnace has a 1-ft 3-in. greater diam than several built in the past

decade measuring 28 and 29 ft.

Designed and erected by the Freyn Dept. of Koppers Co., Inc., Pittsburgh, the new facility rises 252 ft above yard level, has a total interior volume of 64,425 cu ft.

Foundation support includes concrete pads 71 ft in diam and 16 ft thick which rest on steel piling extending 84 ft to bed rock. Firebrick of various dimensions equivalent to 2,844,694 of the standard 9-in. size were used to line the furnace, its three hot-blast stoves and other auxiliaries.

Capacity Will Rise

Total weight of the furnace when fully charged is 12,813 tons.

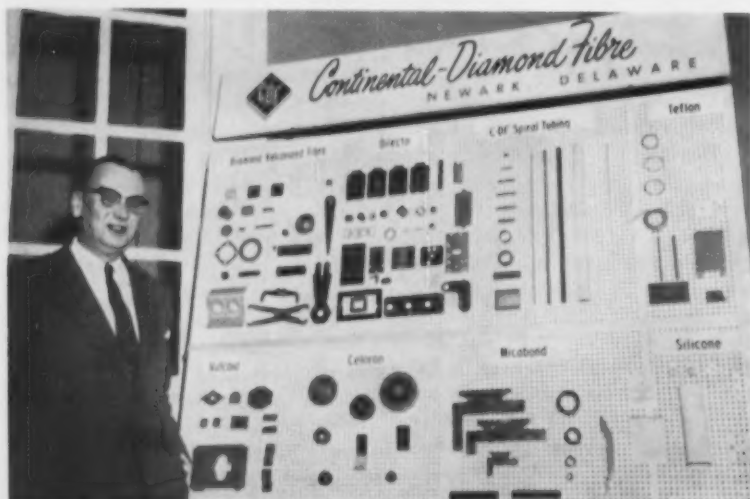
Rated capacity of the new unit is 50,000 tons of iron per month. As operating experience develops, engineers estimate capacity may average more than 60,000 net tons a month.

The new facility, completed in 10 months, replaces a 20,000 tons-per-month installation dismantled last year after 19 years' service. It restores to four the number of furnaces at the company's Zug Island plant. Total rated capacity of the four furnaces is 2,050,000 tons a year.

Add Electric Furnace

A large new electric furnace was recently turned on by Ohio Ferro-Alloys Corp., Canton, O., at the company's Philo, O., plant. Part of a \$1 million expansion program, furnace is the largest ever built by the company, will be joined by a second unit of similar capacity in a few weeks.

The new furnaces will raise the plant's capacity about 40 pct, are housed in a recently completed building that is separate from the original Philo plant. Transformers, handling equipment and dust collecting devices were installed.



DIVERSIFIES: E. G. Budd, Jr., president, The Budd Co., Philadelphia, points to some products of newly acquired subsidiary, Continental-Diamond Fibre Div. of The Budd Co., Inc.

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Whatever your application . . . in new construction, new equipment or replacement, you'll find Jal-Tread offers you the shortest way to:

Safe Footing—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface, protect against lost-time accidents.

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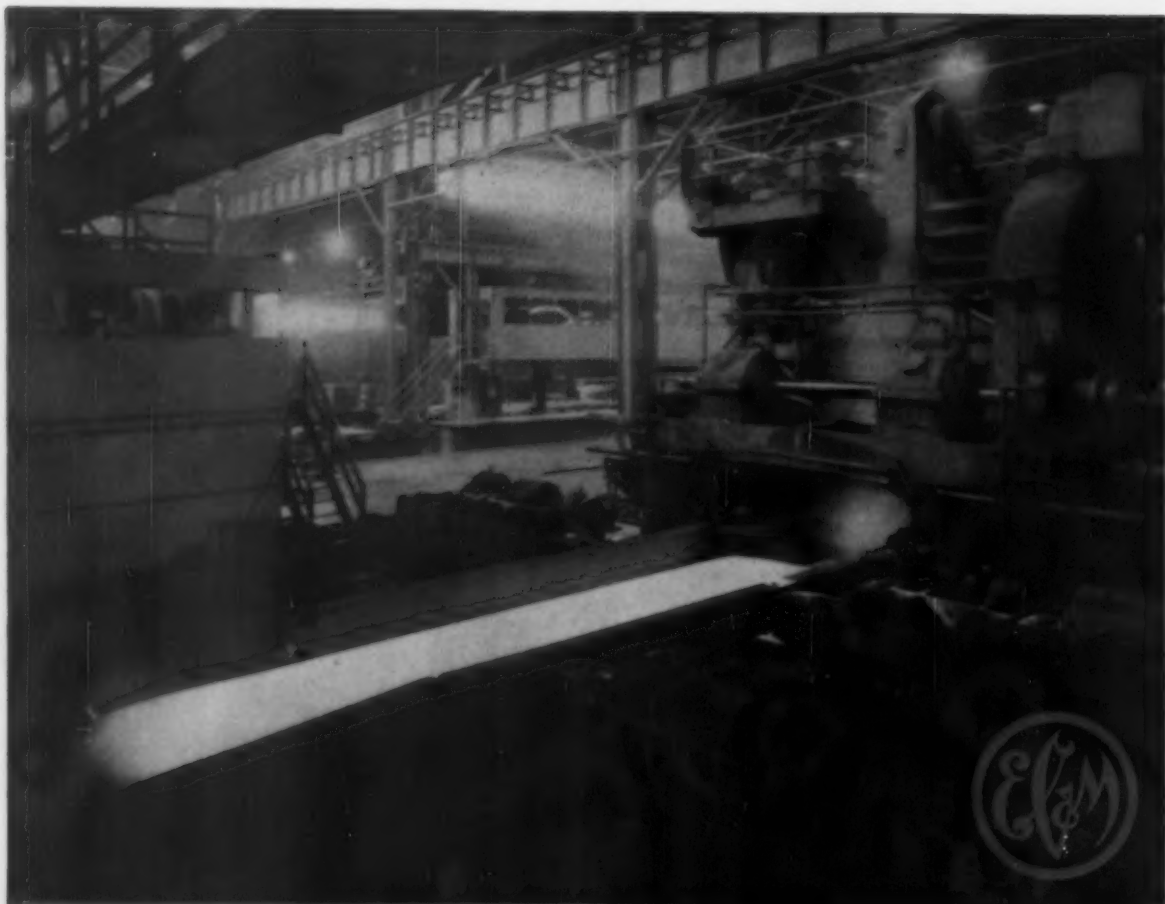
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Like An Organ Player, The Operator Rolls Steel from button-panel using schedule No. 1 while an assistant prepares schedule No. 2 for a change in rolling requirements.

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Also in This Same Plant is The World's Largest Plate Mill (shown above). It has been EC&M controlled for many years.

4499 Lee Road, Cleveland 20, Ohio

Report To Management

Labor Has Lost Its Mobility

New auto industry contracts saw to that. Time has expired when a laid off auto worker packed up his straw suitcase, went back to the hills or to another labor market when a fickle public quit buying cars.

First non-contributory pensions

started the trend to labor immobility. Seniority rights helped it along. For the first time, a worker found himself with an equity in the company which he couldn't afford to leave behind. Effects are already widespread, will become more so.

A cutdown in turnover is beneficial

to most industry. It means less time on job instruction and breaking in new workers. In skilled labor it prevents acute shortages and bidding among competing companies.

It also means higher overtime

pay instead of hiring for short term periods. This was a big factor in keeping total employment lagging behind other boom trends in the current recovery periods.

GAW Will Accelerate This Trend

The inevitable result, which is already taking place in the auto industry, is a constant labor force, leveled off production.

This will aid suppliers

of parts and accessories in planning their production. It will enable them to stabilize their own employment, plan for a full year's production instead of an uncertain year of peaks and valleys.

It Won't Be All Profit to Labor

Some segments of labor will find problems and, in fact, have found them already in pension and seniority complications.

Older workers already find it tough

to get jobs in industry. Seniority workers in closed-down auto parts plants lost their seniority, couldn't find work elsewhere.

Work forces will be kept as small

as practical so as not to run into layoff problems. Older workers won't be hired because they are too close to pension time, would cost too much from that point of view.

This Is Not the End

At the end of 3 years the UAW will have another crack at it. Instead of 26 weeks at some 60 pct of pay, the cry will be 52 weeks at 80 pct. Meanwhile, other industries, steel for instance, will have had their crack at it.

Prices Will Have to Go Up

Although the customer is in the driver's seat, industry can go just so far in absorbing higher costs. It almost has reached that point.

Metals, particularly copper and

other nonferrous, have already contributed to increased costs. Steel will climb several dollars a ton shortly after settlement of the new contract with the steelworkers.

Auto prices won't jump

this year. The easy selling part of the year is nearing its end and sales will be tough enough to make without jumping prices. The same pattern exists in appliances.

But inevitable increases will stimulate

sales throughout the rest of the year. Wise shoppers will try to beat increases later on.

The Crisis Is Past

The critical point in the 1955 recovery period is past with the peaceful settlement between Ford and the UAW, regardless of pros and cons on the principle of payment for laid off workers.

INDUSTRIAL BRIEFS

Realignment . . . Stran-steel Div. of Great Lakes Steel Corp. will become a separate corporate unit of National Steel Corp. on July 1. Change is being made to coordinate Stran-steel sales, manufacturing and engineering activities as part of a program to expand this section of the business on a nation-wide basis. Stran-steel is expanding its national sales organization by increasing personnel and establishing new zone offices in Atlanta, Cleveland, Houston, Kansas City, and Minneapolis.

Ore Shipments Rise . . . Lake Superior iron ore shipments this year will probably total between 80 million and 85 million tons compared to 61 million tons last year.

Bought Out . . . American Brake Shoe Co. has purchased the Denison Engineering Co., Columbus, Ohio, one of the country's leading manufacturers of hydraulic presses, pumps, and automatic controls. Brake Shoe has acquired all the outstanding stock of Denison, which becomes a wholly-owned subsidiary.

Expansion . . . The United States Hoffman Machinery Corp. has purchased the Intercontinental Manufacturing Company, Inc., of Dallas, Texas. U. S. Hoffman manufactures textile maintenance equipment, pneumatic conveying systems, centrifugal blowers and exhausters, oil filtration units, metal finishing and ordnance equipment.

New Addition . . . Continental Foundry & Machine Co. is constructing additions to present buildings at the company's Wheeling, W. Va. works to provide better working conditions in the machine shop.

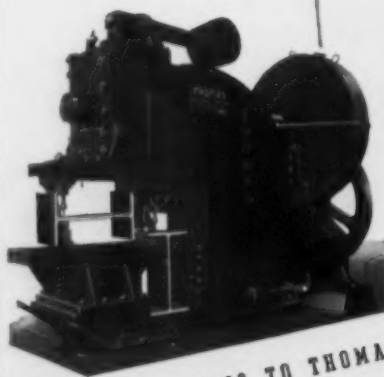
New Mills . . . Aluminum Company of America announces the installation of new 72 inch, four-high foil mills at its Alcoa, Tenn. plant. With uses of aluminum foil on the increase, greater production of the versatile product has become necessary. Trying to keep pace with the foil demand prompted ALCOA to build these mills, which are now ready to supply the market.

Contract . . . Wheland Company of Chattanooga, Tenn. has been awarded a contract to produce the flap track rib assembly for the U.S.A.F.'s new CO130 A Hercules all-purpose military combat transport which Lockheed is building in Marietta, Georgia.

Build Derrick Barge . . . Higin, Inc., of New Orleans, will build a 300 by 90 foot derrick barge with a derrick capacity of 250 tons. The contract is the largest single item to be received in the company's new commercial promotion.

Fixed Price Contract . . . The United States Air Force announced the signing of the first fixed price incentive type contract with the Georgia Div. of the Lockheed Aircraft Corporation to manufacture C-130 Hercules turboprop medium combat transports. It includes the manufacture of an undisclosed number of airplanes, spare parts, ground - handling equipment, training aids.

BEAM PUNCHING *without tool change*



THE TREND IS TO THOMAS

* Write for further information

THE newly designed Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

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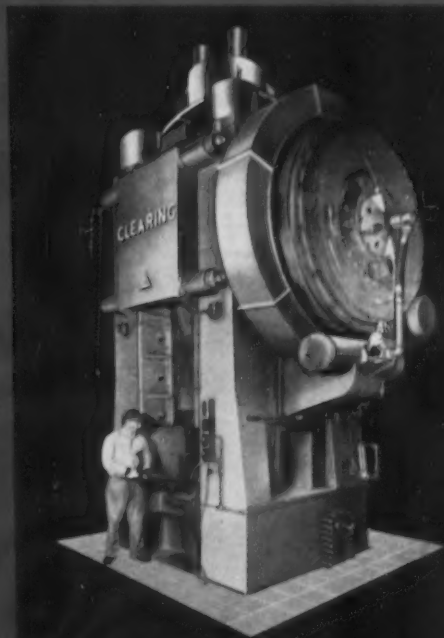
Take a Tip from This Forging Job



To meet the urgency of military requirements, the forgings industry took giant strides in developing blades and buckets for jet engines.

The steels used in these forged parts are extremely tough titanium alloys. Shape of the part is unusually complex and difficult to machine. By working out methods to press forge these parts, the forging industry was able to mass produce them to tolerances that all but eliminate machining and economize on the expensive material, too.

There are many parts like this one which can be produced with much greater economy. This may be true about some parts that you are making. We'd like to send an engineer who can talk your language and share your problems. There'll be no obligation.



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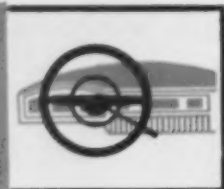
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Packard Hopes Ride on Torsion Bar

Luxury leadership goal is based on innovation . . . Torsion bar is first example . . . Division hopes to show profit on 100,000 cars . . . Record production for industry may be reached—By T. L. Carry.

♦ **PACKARD'S BID** to regain its lost leadership in the luxury car field is showing signs of success. A big factor is the new torsion bar suspension, first in U. S. automotive history.

It is helping Packard, now a division of Studebaker-Packard Corp., reach its goal of 100,000 cars a year, the figure that James J. Nance, company president, set as the profit making point for the division.

The torsion bar suspension, installed in Packard's competitive styling of 1955 models, is part of Mr. Nance's comeback plan charted for Packard and an illustration of the basic direction of Packard's planning and is expected to find wide acceptance.

Plan Innovations . . . In 1952, Mr. Nance, an outsider to the auto industry, was picked to head the company in its attempt to recapture its position in the automotive field.

But before he could do anything else, Mr. Nance had to assemble a management team. This accomplished, the next thing in line was a thorough study of the company's history. The secret to Packard's success in the past, he decided, was the company's reputation as a leader in the field of new innovations.

There were three ways in which these innovations could be exploited. The company could specialize and limit its field, improve its styling or look for something

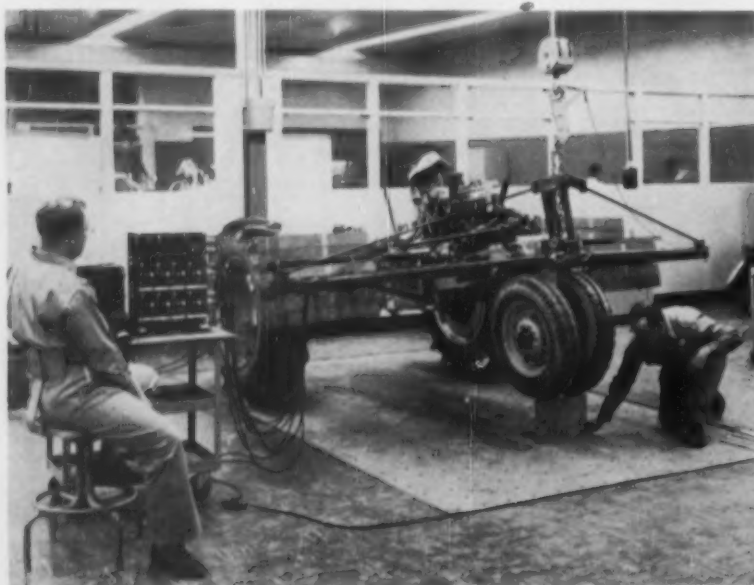
entirely new and different in the field of engineering.

The latter course was decided on and 3 years after he became president, the company produced Mr. Nance's version of what a Packard should be. The most startling innovation was the introduction of torsion bar suspension. The system had never before been used in an American car. Torsion bars have been widely used by British and other foreign makers.

Conventional front and rear springs, which had been used by the American auto industry in one form or another since 1934, were eliminated.

Employs Levelizer . . . In a torsion bar suspension, long steel bars are placed on each side of the chassis frame and are extended from front to rear. They are connected to the front wheels and rear axle by steel arms. The rotary motion of the arms is transmitted into a twisting action in the bar which absorbs the road shocks.

In addition to the torsion suspension system, Packard engineers came up with another unique innovation, a car levelizer. The levelizer consists of two additional torsion bars about half the length of the main bars. They are attached at the rear to the previously mentioned support arms. The front of the smaller bars is connected by links to an electric motor which operates under a control mechanism and compensates for weight carried. In any case, the car stays on a level.



SENSITIVE electronic gages check stresses in tractor chassis at Ford's new Farm Machinery Research and Engineering Center, Birmingham, Mich.

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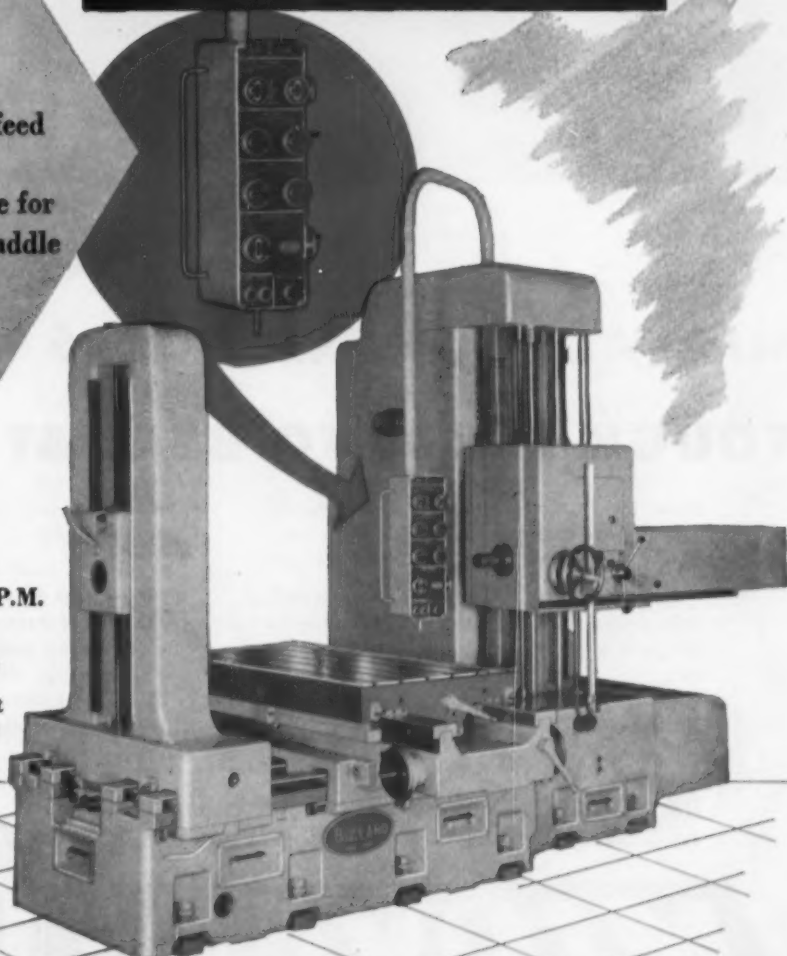
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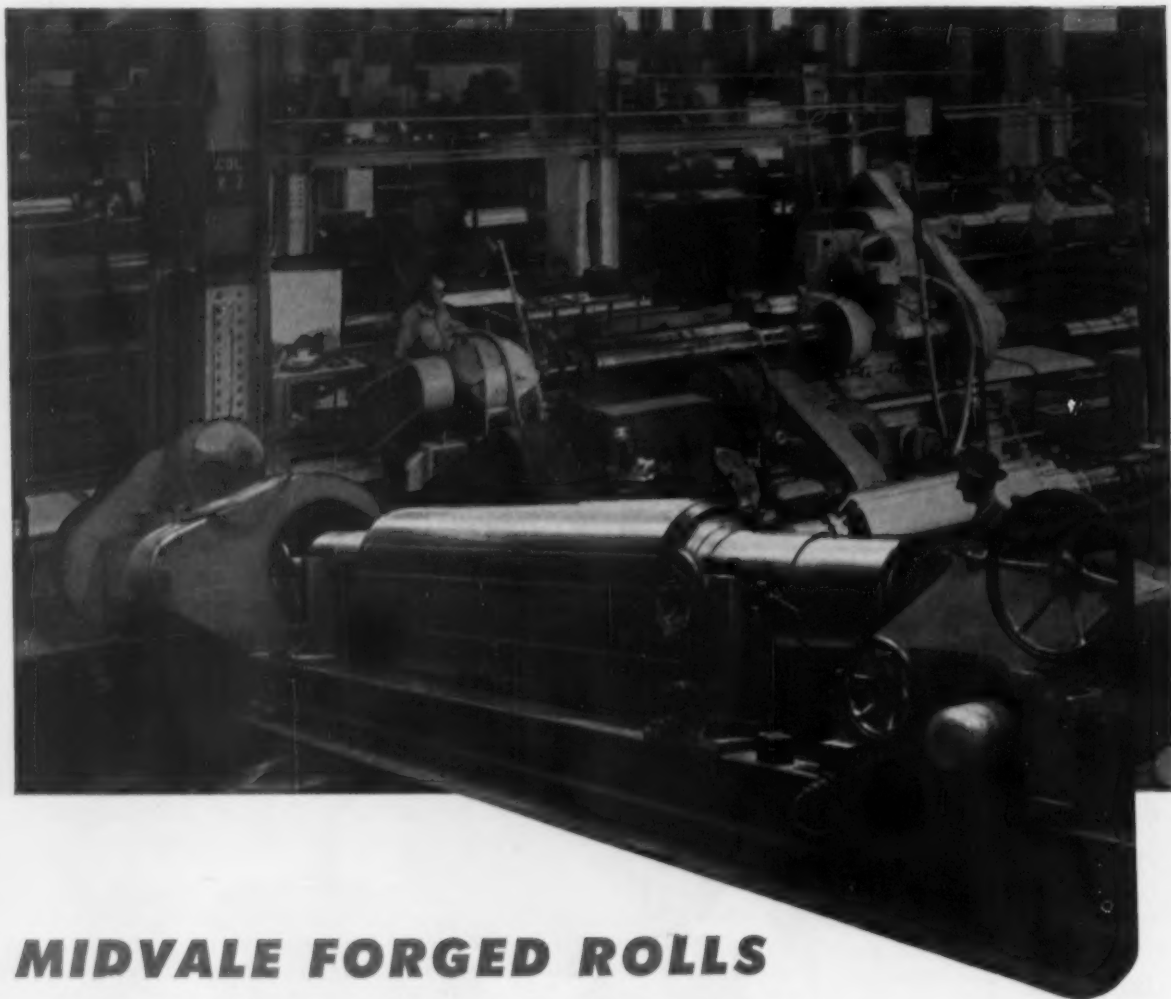
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From the furnace to finished grind Midvale Forged Steel Rolls are made with greater durability to provide a finer finish for longer runs.

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MIDVALE



FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
June 11, 1955	158,239*	30,148*
June 4, 1955	135,980	27,141
June 12, 1954	118,191	21,121
June 5, 1954	102,077	17,611

*Estimated Source: Ward's Reports

that does not vary more than one inch.

Smooth Ride . . . So much for the theory. A ride in the 1955 Packard shows that the system really works and works well.

Whether you cruise at 70 mph or slow down to 30 mph, the car stays level. Road shocks are mostly absorbed before they get to the chassis and the car's cornering ability is excellent. There is no noticeable change in the ride whether you drive at extremely high speeds on very rough roads or roll along at a more sedate pace on the newest type of super highway.

It took 3 years to do it, but Packard has come up with Mr. Nance's car. If present production estimates are any criterion, this is the year that will tell the tale for the division. Packard hopes to produce 100,000 cars this year. Fifty per cent of the production is scheduled for the luxury Patrician and Four Hundred lines. The other half will be used for the style pilot Caribbean and the Clipper.

Production:

It could break all automotive records.

There could be a slight drop in automobile production later this year and it could still set a record. An unofficial estimate of the industry's output of cars alone in the first 5 months of this year is set at 3,608,247. That's an average of over 720,000 cars a month. The industry could coast along for the next 7 months and only produce 3½ million cars and still break the 1950 record of 6,660,000 units.

Most industry sources agree that production is going to sag a little in June. But with the new unemployment benefit program

just granted to Ford workers, the company is going to be shut down for the shortest time possible for model changeovers. Insiders agree that GM will close only briefly.

Chrysler Corp. has already alerted its dealers to be ready for new models so they can sell out the 1955 line accordingly. The independents are coming out earlier than usual with their 1956 lines. American Motors is getting set for a September introduction.

Once the new models are introduced, the industry isn't going to coast. If present rates of production continue, over 8½ million cars will roll off the assembly lines by the end of the year.

Ford Courts Farmers

Another step in Ford Motor Co.'s bid for a bigger share of the farm tractor and implement business was completed last week with the opening of a research and engineering center at the Tractor and Implement Div. headquarters in Birmingham, Mich.

Covering 112,000 ft of floor space, the new center contains facilities for tractor, implement and harvesting machine engineers to

Automotive News

plan, develop and design new types of farm machinery.

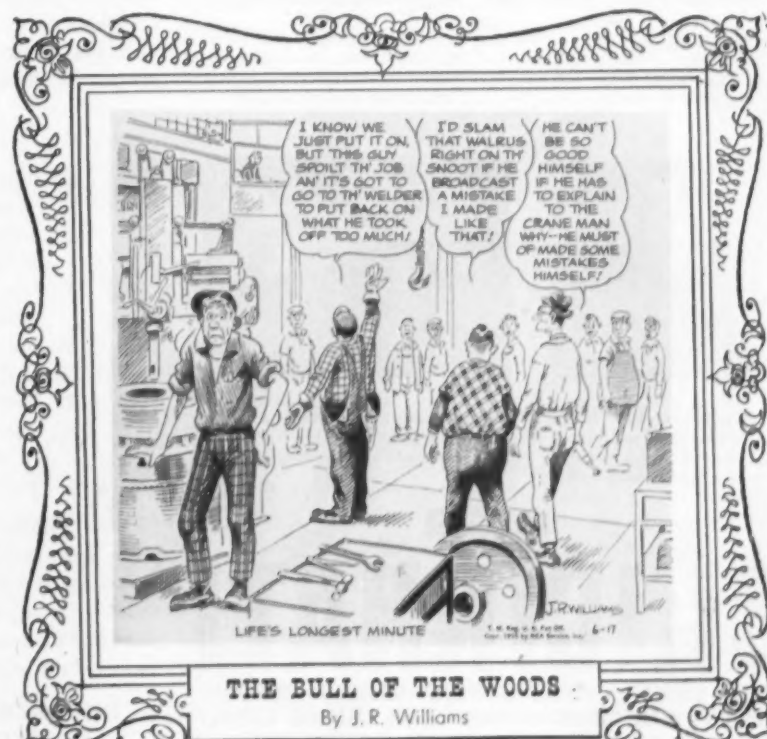
In addition, the center contains three dynamometer test cells. There are also fatigue and hydraulic laboratories, a stress and strain section and a plastics and quality control laboratory.

The largest part of the center is a build-up and tear-down area where new machines are designed and torn down scientifically.

An adjunct to the engineering center, an outdoor test track, is presently under construction and expected to be completed sometime this year. Here, Ford can field test preproduction models.

New Chevrolet Engine

A second V-8 truck engine has been introduced by Chevrolet Div. of General Motors Corp. The new engine, called the Trademaster, produces 145 hp and is designed for light and medium trucks. The addition gives Chevrolet the widest range of truck motors in its history with five 6-cylinder engines and two V-8's.



NEW CINCINNATI HyPowermatics

make quick work of
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milling operations



CINCINNATI No. 420-184 Hy-Powermatic Milling Machine with Automatic Quill Retraction.



Convenient, compact grouping of operating controls reduces fatigue. HyPowermatic design will make a big hit with your operators.



Save the smooth surface made by face milling cutters, with Automatic Quill Retraction (optional equipment at extra cost).



Chip catcher bed design keeps the floor clean. Chips and cutting fluid stay where they belong, within the bed.



Hardened and ground table ways and square gib construction add their share to HyPowermatic's high cutting capacity.

You'll see costs tumble down when you assign your heavy duty milling operations to new CINCINNATI HyPowermatics. They have the capacity to remove metal quickly; they have new control features that help the operator turn out more work with no increase in effort. Reasons why are numerous:

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- 5) Automatic two-way table cycles
- 6) J.I.C. hydraulic and electrical standards
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Eleven additional highlights of design and complete specifications for all HyPowermatics will be found in new catalog No. M-1871. Ask for a copy today... compare... and you'll see why CINCINNATI HyPowermatics can make quick work of your heavy duty milling operations.

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CINCINNATI 9, OHIO



U. S. Acts on Aluminum Shortage

ODM will divert third quarter stockpile quota to fabricators . . . No decision now on fourth quarter, expansion program . . . Producers press for ceiling on aluminum scrap exports—By G. H. Baker.

◆ **TIGHT ALUMINUM** supply situation will be eased by government measures now being prepared. A top-level policy decision now in the works at the Office of Defense Mobilization directs the "forgiving" of all third-quarter stockpile requirements and the diversion to civilian fabricators of this entire amount.

The policy decision applies only to third-quarter production. As far as fourth-quarter production is concerned, the ODM takes the position that "we'll cross that bridge when we come to it."

ODM has been under considerable pressure from Congress to order the cancellation of stockpile requirements for the entire second half of 1955. But a new government study of the supply and demand situation in aluminum suggests that the current pinch being experienced by fabricators may be only a temporary squeeze that will ease off within a few more weeks.

Ask Export Limit . . . Aluminum producers are asking Commerce Dept. to place a 1 million lb-per-month limit on exports of aluminum scrap. This ceiling, plus the "forgiving" of the government's call for stockpiling in the third quarter, would go a long way toward easing the hardship cases that now exist.

Talk of a "third round" of beefing up basic capacity is being held up at ODM until the effects of these diversion moves are studied and measured.

Eye Contract Profits . . . Renegotiation of all big defense contracts

and subcontracts is the only way for the government to prevent "runaway" contract costs, the Eisenhower Administration tells Congress.

The government's authority to re-open defense contracts and to force contractors to pay back "excessive" amounts expired last Dec. 31. Congress is mulling the Administration's proposal that the law be renewed, retroactive to Dec. 31.

The Administration estimates all renegotiable defense contracts at about \$20 billion annually. It says it has forced contractors to return more than \$355 million since 1951, and claims the mere fact that a renegotiation law is on the books is a psychological barrier to the "loading" of contracts.

The Air Force says it is impossible to let contracts for new-type

planes on the basis of advertised bids.

The National Association of Manufacturers is opposing any extension or renewal of renegotiation. "Renegotiation is either second guessing, which is contrary to all principles of contract law, or is a disguised taxing measure which does not meet any of the criteria of a sound taxing system," the NAM states.

Will Profit More . . . Your plant's employment executives can anticipate a big jump in the draft rate next year. In the 12-month period beginning July 1, the selective service system probably will send "greetings" to about 250,000 men, which is more than twice the number of men being drafted in this fiscal year.

This sharp rise will have a noticeable effect on the number of young men available for employment, and also on the number of "quits" and resignations among apprentices and trainees.

The Army thinks that draft officials are too pessimistic — that voluntary enlistments will remain at their present level. If they are right, draft calls will climb but not as steeply as the 100 pct increase foreseen at selective service headquarters.

Draft officials say the Army is too strict in its standards for draftees. At the present time only 6 out of every 10 men examined are found to be acceptable. This means there are today more than 2 million men under 26 "unfit" for military service. If and when the Army reaches the bottom of the



"Very good! You'll be able to solo soon."



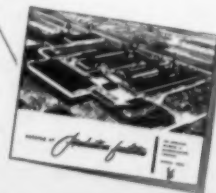
The manufacture of circular weldments — rings and bands — has been an American Welding specialty for 37 years. Here you will find the men, the know-how and the equipment to form, weld and machine circular components for a wide variety of end products. Big ones (96 inches) or small ones (6 inches), of ferrous or non-ferrous metals including Titanium* or Aluminum, in production runs of hundreds, thousands, or ten thousands.

If your problem is "round and metallic" consult our Industrial Products Division. Write or call today — we will be glad to work with you.

*First successful Production Welding of Titanium Alloy was accomplished by American Welding in 1949.

Production Facilities Catalog

Find out what American Welding can do for you. Send for **FREE** Catalog today.



AMERICAN WELDING

THE AMERICAN WELDING AND MANUFACTURING CO. • 120 DIETZ RD. • WARREN, OHIO

barrel, it will take a second look at this group.

Plan Merger Check . . . The government is going to try to upset several big new industrial mergers. And the chances that they'll succeed in doing so are regarded as better than 50-50 by political observers.

Under present plans, Federal Trade Commission lawyers will bring legal action under Section 7 of the Clayton antitrust act, which forbids any mergers that result in less competition. FTC officials decline to discuss the names of the companies involved beyond saying "they'll soon know about it."

Automobile manufacturers are safe for the time being, however. FTC Chairman Howrey discloses in Capitol Hill testimony that the government now believes the mergers of independent automobile manufacturers will aid in restoring a wider degree of competition in auto sales.

Say Others Hurt . . . In other industries, the government lawyers are preparing to argue that some recent mergers are causing less, not more competition in the affected industries. Most mergers in recent months have been in metals, nonelectrical machinery, automobiles, textiles, foods, and dairying.

The Eisenhower Administration is getting a little nervous about the high rate of mergers. It won't let the trend roll on undisturbed, for a "big business" label can often be a political liability. Hence, the upcoming move to order the "unmerging" of some recent amalgamations.

Aid Machine Exports

Credit insurance to assist three United States exporters finance sale of productive capital equipment and related services abroad are authorized by the Export-Import Bank.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., is granted a "credit line" of \$800,000 to insure financing export sales of horizontal boring machines, ver-

tical boring mills, planer-type milling machinery, and other machine tools.

Bucyrus-Erie Co., South Milwaukee, Wis., is granted \$1.7 million to help finance export sales of excavating machinery and drills.

The third firm, Gar Wood Industries, Inc., Wayne, Mich., receives \$700,000 to finance exports of truck bodies, hoists, and winches; tractor equipment; shovels, cranes, ditchers, and other road-building machinery.

Titanium:

U. S. program gets 2nd look as output tops use.

Government officials are currently engaged in an "agonizing reappraisal" of the one-time crash program for titanium production. The scorching criticism of the Senate Armed Services Committee has been added to their troubles.

Government planners, after frantic efforts to spur production of titanium sponge, now find they are the prime customers of a metal that, while it has tremendous potential applications, is in only negligible demand by industry.

"It is evident that the government, by assuming substantial risks in obtaining heavy production of a product not yet commercially acceptable has cost the tax-

WASHINGTON NEWS

payer many millions of dollars—and may cost him a great deal more," the report says. It was authored by Sens. Stuart Symington, D., Mo., and James H. Duff, R., Pa. *

Output Soars

The committee urges the government to spend more money in research and development to obtain an improved metal, and less for expansion of production of a metal which is not commercially acceptable. Potential uses of the metal merit continued government support, the committee believes, but more research, better coordination and more knowledge are needed.

As a result of the expansion in titanium sponges, the committee says, production totaled 5370 tons in 1954, and will amount to about 10,000 in 1955; 17,500 in 1956, and 22,500 tons in 1957. If a contract now being negotiated between the government and Du Pont for additional capacity (deadline for signing is now July 31) is signed, production will reach 30,000 tons in 1957.

But only 1500 tons were used in 1954, and use is estimated at only 1700 tons in 1955, with little increase in the next 2 years unless a number of technical problems are solved.

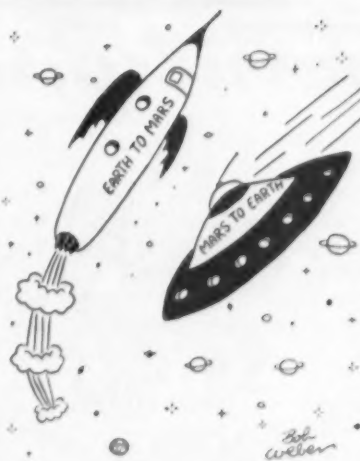
Sell More TV Sets

Retail sales of television receivers and radios (except auto radios) are higher this year than last year.

Radio - Electronics - Television Manufacturers Association (RETMA) reports that 669,794 TV sets were sold through retail outlets in March, compared with 626,613 in February, and 505,493 in March of 1954.

First quarter TV sets sales totaled 1.9 million, compared with 1.7 million in the same period '54.

Radio sales in March totaled 451,049, compared with 320,042 in February and 486,034 in March, 1954.



Farrel Gears...

for tough-job applications

The *backbone* in Farrel continuous-tooth herringbone gears, formed by the meeting of the two helices without a center groove, puts the *entire* face width of the gear to work for you.

This provides extra strength and greater capacity for wear and shock resistance—especially important in *tough-job* applications like those below. The opposed helices balance and absorb axial thrust within the gear member, preventing harmful thrust loads with resultant stresses on other parts of the machinery.

Farrel continuous-tooth herringbone gears are made of the finest grade materials, in any size from 1/4 inch to 20 feet in diameter. Send for information about these gears, or, if you prefer, a Farrel engineer will be glad to assist you in working out unusual gear problems.

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONNECTICUT

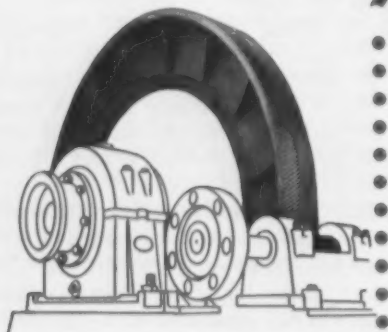
Plants: Ansonia and Derby, Conn.
Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Akron, Detroit, Chicago, Memphis, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans

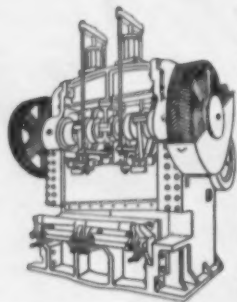
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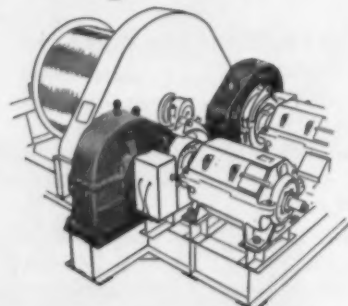
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Ball mill equipped with Farrel-Sykes gears. ●



Shear for cutting mild steel 3" thick by 120" wide. ●



Skip hoist driven by two motors through Farrel speed reducers. ●

Water Heater Market Bubbles in West

Housing boom, natural gas delivery promise new gains for big Coast industry ... Area makes 40 pct of nation's electric, gas units ... Local mills and parts makers will profit—By R. R. Kay

◆ **WESTERN** water heater manufacturers keep the country in plenty of hot water. They now make some 40 pct of the nation's gas and electric units and look forward to a healthy increase in business through 1956.

Behind this cheerful outlook are: (1) construction industry estimates of a good 20 pct rise in home building this year; and (2) delivery of natural gas to Pacific Northwest consumers promised for 1956—sure to open up a huge new market. (See *THE IRON AGE*, Dec. 30, 1954, p. 37.)

This optimistic forecast means good business for a lot of metal-working companies and suppliers. Most of the steel used by water heater manufacturers here—hot- and cold-rolled sheets, hot-rolled strip, and steel pipe—comes from western mills.

Make Parts Too . . . And western shops make practically all components and steel parts. Business will be good for suppliers of steel castings, fittings, screws, bolts, clips, copper wire and tubing, magnesium rods, brass castings, fiber glass insulation, and draft diverter, thermostat, and faucet drain assemblies.

Western water heater manufacturers (California, 16; Oregon, 2; Washington, 3; Utah, 1) turned out 850,000 units in 1954. The Pacific Coast states and Arizona bought half of them. An *IRON AGE* survey shows some makers think 1955 production will hit the million mark. And western production capacity will rise about 45 pct when A. O. Smith Corp. gets going with a new California plant.



EXPANDED Hanford St. grain elevator in Seattle uses new Hammond tanks, has 6 million bu capacity.

Push Glass Linings . . . Several big companies are pushing research and production on "glass-lined" heaters. They think ceramic-coated tanks have a big future. Whether the glass-lined product will replace the galvanized-lined tank depends on how it catches on with the customer.

Big question today is how to increase water heater life, considerably shortened since pre-World War II. Units take a real beating these days. They operate at higher temperatures, under heavier loads, what with the past 10 years' increase in home washing machines and dishwashers. And heaters have to contend with the added corrosiveness.

Build Test Reactor . . . Atomic energy development work will get a big boost. A \$10-\$15-million en-

gineering test reactor to go up in the West will make possible high-radiation testing of materials used in cores, fuel assemblies, and other components of reactor work.

Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif., got an Atomic Energy Commission contract to design the facility for the government's National Reactor Testing Station in Idaho. George Havas, vice president and general manager, says General Electric Co. will work on special nuclear design phases of the job.

Job Prospect Cheers . . . Work-hungry West Coast shipyards see an encouraging sign. Maritime Administration's nod for a big conversion job may go to a Pacific Northwest yard instead of to an East Coast firm. Willamette Iron and Steel Co., Portland, Ore., looks like a good bet to get a \$26.6 million contract converting two 563-ft Mariner-type cargo ships to passenger liners.

Another fat plate order is in the making. A 30-in. natural gas pipeline may soon stretch 277 miles from Los Angeles to the California state line at Topock. It's a \$30.6-million project.

Fruehauf Trailer Co. plans new plants in Los Angeles and San Francisco or Seattle. It's part of the company's \$9 million expansion program this year.

International Oil & Metals Corp., Seattle, was formed to develop minerals on the West Coast. Company controls: International Iron Mines, Ltd., of Canada; International Metals Corp., of Idaho; Silver Ridge Mining, Ltd.

WORLD'S LEADING ENGINEERS SPECIFY MORSE HY-VO DRIVES!

- FOR EFFICIENCY
- FOR DEPENDABILITY
- FOR ECONOMY
- FOR PERFORMANCE



Florida Flood Control Project: Dependable Morse HY-VO is on the job at the world's largest self-powered, low-lift pumping station. Designed to maintain a uniform water level in Lake Okeechobee, the project eliminates danger from floods and drought, permits the reclamation of 1100 square miles of potentially rich farm lands.

This pumping station houses six horizontal axial-flow propeller pumps, each with a capacity of 360,000 gallons per minute—a total capacity of 3.1 billion gallons per day! Each



pump is driven by a 1600 hp opposed-piston diesel engine.

Morse HY-VO Drives were specified by the Army Corps of Engineers, as primary and secondary pump drives, for three reasons: (1) The field-proved performance of HY-VO assured round-the-clock dependability under severest operating conditions. (2) HY-VO permitted the use of lighter weight, lower cost engines. (3) Savings in required space for HY-VO Drives eliminated the need to increase the size of the buildings housing the pumping units.

This typical application of HY-VO is only one of a tremendous number where Morse HY-VO Drives are successfully used.

There are many reasons why Morse HY-VO is specified in applications demanding performance "extras": HY-VO's longer service life reduces per-hour operating cost; HY-VO is easy to assemble, install, and maintain on the job—keeps downtime down. Capable of transmitting up to 5000 hp in single-drive units, HY-VO runs at speeds up to 8500 fpm and makes possible the economies of using lighter weight, higher speed engines. HY-VO cuts vibration to a minimum, runs smoothly and coolly while trans-

mitting power with less sprocket-tooth wear and more than 99% efficiency.

HY-VO is available from your local Morse Representative's stock. Wire, write, or phone him today, for complete HY-VO information. Put dependable Morse HY-VO to work cutting costs on your heavy-duty drive applications.

Find out, too, about the other quality products that your local Morse Representative stocks for your power transmission requirements: Morse Roller Chain, Silent Chain, Sprockets, Couplings, and Clutches. MORSE CHAIN COMPANY, INDUSTRIAL SALES DIVISION, ITHACA, NEW YORK.

MORSE



**CHAINS, COUPLINGS,
AND CLUTCHES**



New Gears Give Teeth Bigger Bite

Spiroid design keeps more teeth in contact . . . Gives efficient, compact drive in worm gear applications . . . Near-zero backlash, heavy load capacity, high indexing accuracy—By E. J. Egan, Jr.

♦ **SPIROID** gears, a new development in the family of skew-axis or screw-type gears, made news at last week's 39th Annual Meeting of the American Gear Manufacturers Assn. in Hot Springs, Va. As described in a technical paper presented by Fred Bohle and Oliver Saari of Illinois Tool Works, Chicago, the new gears are aimed at the fields of application heretofore held exclusively by worm gears.

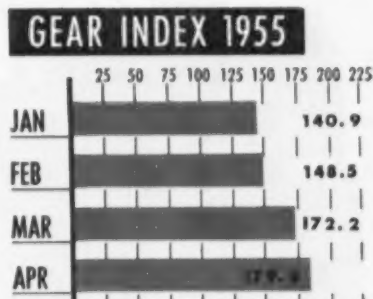
Spiroid gears do not compete with crossed-axis bevel gears, nor with parallel-axis spur and helical gears, Mr. Bohle said. But he added, "In the conventional ratio range presently handled by worm gears—from 10:1 to 60:1—spiroid gears have from three to four times more teeth in contact."

He said that spiroid gear efficiency is never inferior to equivalent worm gears, and that it becomes increasingly superior in the ratio range below 25:1. He stated that due to more power transmis-

sion capacity per inch of diameter, plus a greatly reduced center distance between the spiroid gear and worm, any housing for a spiroid gear set is much reduced in overall size compared to an equivalent worm gear reducer.

Offers Cooling Edge . . . Mr. Bohle said that if the housing is designed to closely envelop a spiroid gear set, the inherent wide spread between mechanical and thermal rating becomes still greater. "Therefore," he added, "the benefits from fan cooling are even more pronounced with the new-type gear reducer design than in ordinary worm gear reducer practice."

The spiroid gear itself is a face-type member resembling a hypoid gear, although its design principles are entirely different. The pinion resembles an ordinary worm except that it is cone-shaped, with constant lead and pressure angle over its entire



Base: 1947-49 = 100

Source: American Gear Manufacturers Assn.

length. The design permits positioning gear and pinion axles so that more teeth are in simultaneous contact.

Chief advantage of the "more-teeth-in-contact" principle is increased load carrying capacity, according to Messrs. Bohle and Saari. This advantage, they said, can be extended to include high indexing accuracy, near-zero backlash control, high torque to weight ratio and high ratios in a single gear set.

New Gear Assn. Officers



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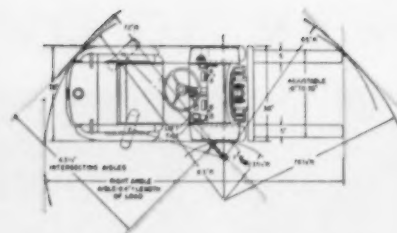
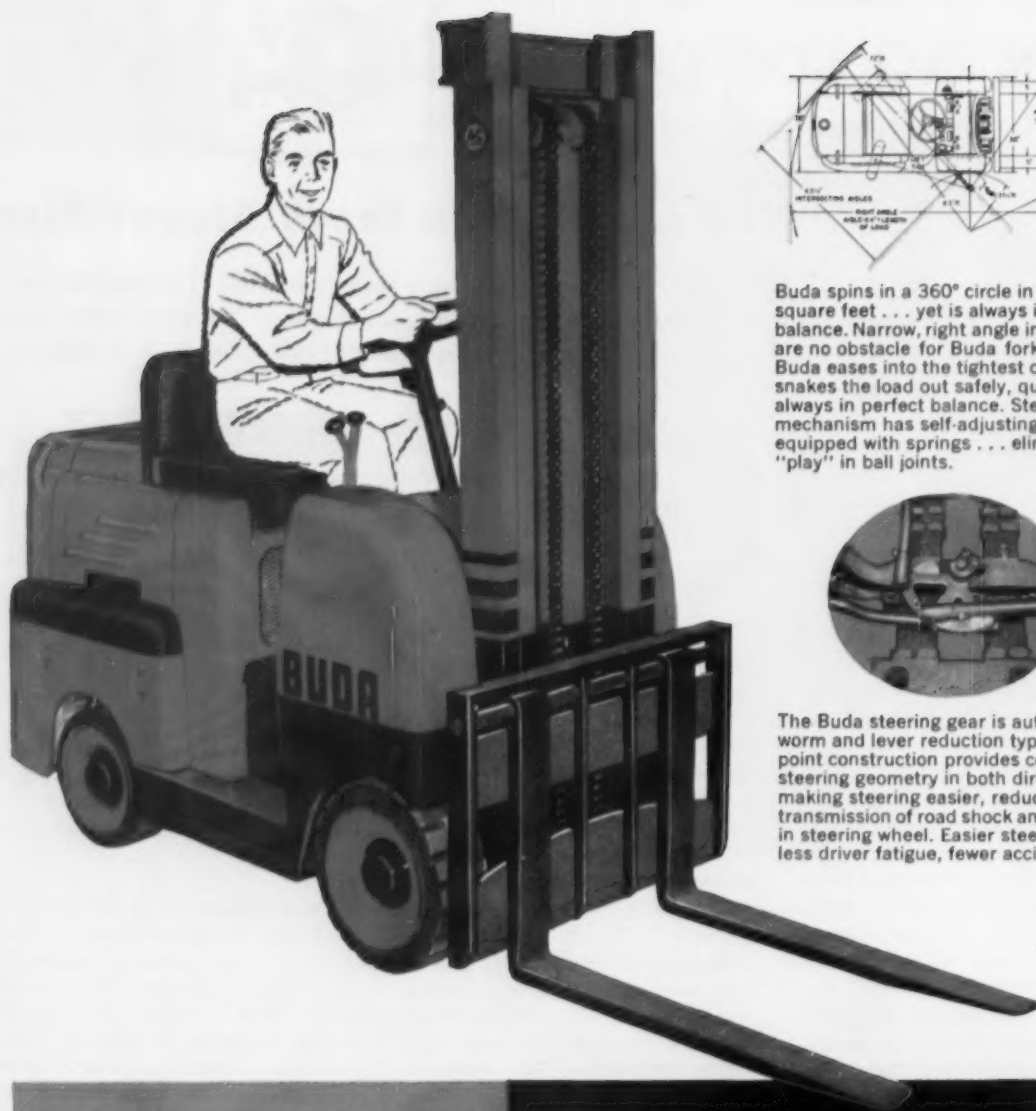
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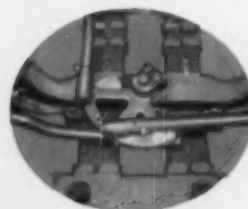
J. L. Buehler
Executive
Committee



D. W. Diefendorf
Executive
Committee



Buda spins in a 360° circle in just a few square feet . . . yet is always in perfect balance. Narrow, right angle intersections are no obstacle for Buda fork lift trucks! Buda eases into the tightest corners, snakes the load out safely, quickly, always in perfect balance. Steering mechanism has self-adjusting ball joints equipped with springs . . . eliminates "play" in ball joints.



The Buda steering gear is automotive worm and lever reduction type. Center point construction provides correct steering geometry in both directions, making steering easier, reducing transmission of road shock and kick-back in steering wheel. Easier steering means less driver fatigue, fewer accidents!

BUDA

IS THE MOST MANEUVERABLE
FORK LIFT TRUCK IN THE FIELD



FREE CATALOG tells how Buda Fork Lift Truck can cut the costs of handling in your plant. Send for it today!



THE **BUDA** DIVISION
Allis-Chalmers Manufacturing Company
Harvey, Illinois



The Iron Age

SALUTES

Philip S. Fogg A broadly educated businessman, he took off on a development push that has kept his company growing and provided a stream of instruments that see more, tell more and do more.

Phi Beta Kappa man Philip Fogg is a hard-headed visionary who bet heavily on research spending and made it pay off in rapid progress for his young company.

President of Consolidated Engineering Corp., Pasadena, Calif., he directs production of electromechanical and chemical instruments. Consolidated products measure strain, analyze mixtures and perform other precision functions. Big problem is to develop quantity sales and production in an industry marked by special manufacture, complex equipment and rapidly advancing research. To lick this many-sided problem, Philip Fogg draws on a background that cuts across state, school and industry lines.

He was born in Battle Creek, Mich.; has lived in Massachusetts, New York and California. Business degrees from Stanford and Harvard, along with 10 years' teaching at California Institute of Technology, indicate a mind well versed in industrial theory. His practical experience ranges from factory work in Battle Creek to engineering and statistical jobs in San Fran-

cisco. He sat in on the 1929 crash as a Wall St. investment analyst. He can talk knowingly with laboratory, production and sales people.

While still professor of business economics at Cal. Tech., he was named treasurer of United Geophysical Co., a small research concern that had just been formed. Formation of Consolidated Engineering followed in 1937 and he became treasurer of the associate company. In 1941 he moved into full-time work for Consolidated as vice-president; 4 years later, he became president.

Since then Consolidated has grown rapidly, building and buying facilities, developing and expanding product lines. Mr. Fogg gears operations to a research program that outdates models every 4 years and looks ahead to instruments of 1965. Intensive research is his answer to the problem of putting manufacture on a mass production basis. He pushes for designs that extend ranges and markets of individual models. He is always seeking instruments that see more, do more; and he's not one to search in vain.

*'round the clock
with*
CF&I-WICKWIRE
WIRE

In this advertisement we continue to take you through a typical day in the life of John Q. Citizen...showing you the part CF&I-Wickwire Wire plays in his everyday activities.



OFFICE BUILDING—8:55 A.M. John never stops to think about it but he rides up to work on dependable elevator cable. Without this indispensable wire product—much of it made of CF&I-Wickwire Wire—modern multi-story buildings would be unable to function.



OFFICE—9:00 A.M. Here we are, inside John's office. Where is the wire? All around us. Paper clips inside the desks. Springs inside the telephones and the typewriters—even under John's swivel chair. Staples, coat hangers, ring binders—these and countless other office necessities are made from wire—very often of CF&I-Wickwire Wire.



FACTORY—3:00 P.M. Let's accompany John on a trip to his firm's nearby factory. The premises are inclosed by a wire fence. Inside, we find wire mesh cloth used as machinery guards. Metal processing belts made of woven wire. Springs of every variety to keep the machines going. All of these products use CF&I-Wickwire Wire.

Watch for the balance of John's day in our next advertisement which takes John back to his home and the relaxation of his living room.

For the Wire You Require—Check CF&I-Wickwire

CF&I-WICKWIRE WIRE
THE COLORADO FUEL AND IRON CORPORATION



WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston
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2492

The Iron Age INTRODUCES

Robert C. Andrews, appointed sales manager, Axle Div., **Clark Equipment Co.**, Buchanan, Mich.

C. G. Hogberg, appointed assistant to vice-president, Michigan Limestone Div., **U. S. Steel Corp.**

William J. Millett, appointed assistant vice-president-manufacturing, Air Conditioning and Refrigeration Div., **Worthington Corp.**

Leon M. Petryck, appointed research metallurgist, welding section, Development and Research Div., **International Nickel Co.**

Richard J. Stamberger, appointed New York sales representative, **Youngstown Sheet and Tube Co.**

John H. Van Horne, appointed manager-reinforcing products department, **Joseph T. Ryerson & Son, Inc.**, Pittsburgh.

Arthur E. Darcy, appointed manager-machine methods department, Coated Abrasives Div., **Carborundum Co.**, New York.

George W. Edick, appointed branch manager-compressor and stationary engine sales, New York, **The Cooper-Bessemer Corp.**

L. G. Murry, appointed manager-export sales, **Aetna-Standard Engineering Co.**, Pittsburgh.

Harry V. Kerker, appointed manager of newly created Export Div., **Oakite Products, Inc.**

R. M. Chamberlin and **Frank Ballard**, appointed plant managers, **Reynolds Metals Co.**, Louisville. **Alan Sparks**, named manager-foil and printing operations, Louisville area.

Arthur E. Thode, appointed industrial advertising manager, Tractor Div., **Allis-Chalmers Mfg. Co.**, Milwaukee.

John K. Light, appointed to newly created position of assistant sales manager, **Arcos Corp.**, Philadelphia.

S. A. Ambler, appointed general foreman, continuous galvanizing department, Pittsburgh Works, **Jones & Laughlin Steel Corp.** **J. C. Hawkins**, promoted to assistant general foreman. **D. W. Ferguson**, appointed master mechanic.

J. Henry Gardner, named administrative assistant to director of public relations and advertising, **Jones & Laughlin Steel Corp.** **Dan Eberle** added to public relations staff. **Eugene F. Jannuzi**, named supervisor, product publicity and institutional advertising. **William J. Troppman**, appointed supervisor, product advertising and promotion. **Lary Wynn**, appointed managing editor of **Men and Steel**, employee publication.

J. D. Dickerson, appointed to the staff of the Central Operating Department, **Crucible Steel Co.**, Pittsburgh. **D. I. Dilworth, Jr.**, named as chief metallurgist at Midland works.

PERSONNEL



WILLIAM E. CLARK, elected executive vice-president, **Dravo Corp.**, Pittsburgh.



MILTON E. BERGLUND, elected executive vice-president, **The Torrington Co.**, Torrington, Conn.



BEN H. CARLISLE, named manager of newly created New Products Div., **Clark Controller Co.**, Cleveland.



FRED H. JOHNSON, appointed engineering consultant, vice-president of planning and administration, **Inland Steel Co.**, Chicago.

Roy Barbier, appointed Detroit district sales manager, Alloy Metal Wire Div., H. K. Porter Co., Inc.

Henry F. Baker, elected vice-president, Paslode Co., Chicago.

Thomas A. Watson, named assistant division superintendent-power production, South Chicago plant, U. S. Steel Corp.

Verne Wildman, appointed general superintendent, American Welding & Manufacturing Co., Warren, Ohio. **Leo D. Dunlap**, appointed assistant general superintendent, and **John P. Lynn** appointed assistant manager of manufacturing.

Walton P. McCord, appointed district manager, Allegheny Ludlum Steel, Corp., Birmingham, Ala., and **Royden C. Presley**, appointed district manager at Buffalo, N. Y.

Norman K. Pettigrew, appointed general manager, Sargeant & Wirbur, Inc., Pawtucket, R. I. **Marshall C. Battey**, appointed sales representative.

Hellmuth Walter, named director of research, Worthington Corp., Harrison, N. J.

Carl J. Eaton, named director of engineering, and **L. R. Lentz**, appointed assistant director, Champion Spark Plug Co., Toledo, Ohio.

Carl D. Rogers, appointed general superintendent - assembly plants, GMC Truck & Coach Div., General Motors Corp.

C. H. Libby, appointed assistant controller, Crucible Co. of America, Pittsburgh.

R. B. Fulton, appointed manager-Cincinnati district, general machinery div., Allis-Chalmers Manufacturing Co.



DAN C. KLINE, named project manager for erection for Mackinac Bridge, American Bridge Div., U. S. Steel Corp.



R. F. AMES, appointed New York purchasing representative, U. S. Steel Corp.



FRANK M. MANSFIELD, III, appointed manager of product planning and marketing research, Carbonyl Department, General Electric Co., Detroit.



A. J. MORGAN, appointed sales manager, Sheet and Strip Equipment, Aetna-Standard Engineering Co., Pittsburgh, Pa.

For every type of shearing machine
and every kind of job



"multicut" 
SHEAR BLADES and ROTARY KNIVES

Engineered to the job . . . Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

"MULTICUT", "TUFCUT", "HOT WORK"

THE WAPAKONETA MACHINE CO.
WAPAKONETA, OHIO.



Knives Engineered for the Job Since 1891



Adding **TITANIUM** to your steel?

There's a grade of
VANCORAM FERROTITANIUM
to meet every steelmaking need

HIGH CARBON GRADE

Final ladle addition in rimming steel and final deoxidizer and scavenger for steel castings and fully killed steel ingots.

MEDIUM CARBON GRADE

Often preferred to the high carbon grade as a final ladle addition to very low carbon rimming or effervescing steels.

LOW CARBON GRADES

25% Titanium—carbide stabilizer in high chromium corrosion-resistant steels and deoxidizer for some casting and forging steels.

30% Titanium—carbide stabilizer in high chromium corrosion-resistant steels in applications requiring intermediate titanium content.

40% Titanium—carbide stabilizer in high chromium corrosion-resistant steels where smaller titanium additions are desired.

27-32% Titanium Special (various types)—series of alloys with high Titanium/Aluminum ratios for adding relatively large amounts of titanium to stainless and heat-resistant steels and alloys where very low aluminum content is required.

Then **VANCORAM FERROTITANIUM** is your best buy.

Years of experience in the production of millions of pounds of these fine ferro alloys insures the superior quality necessary for every type of product . . . from rimmed steel to the highest alloy, stainless and heat-resistant steels—and special alloys.

Contact your nearest VCA office for full details. Our Sales and Technical Service representatives will be glad to help you with your application.

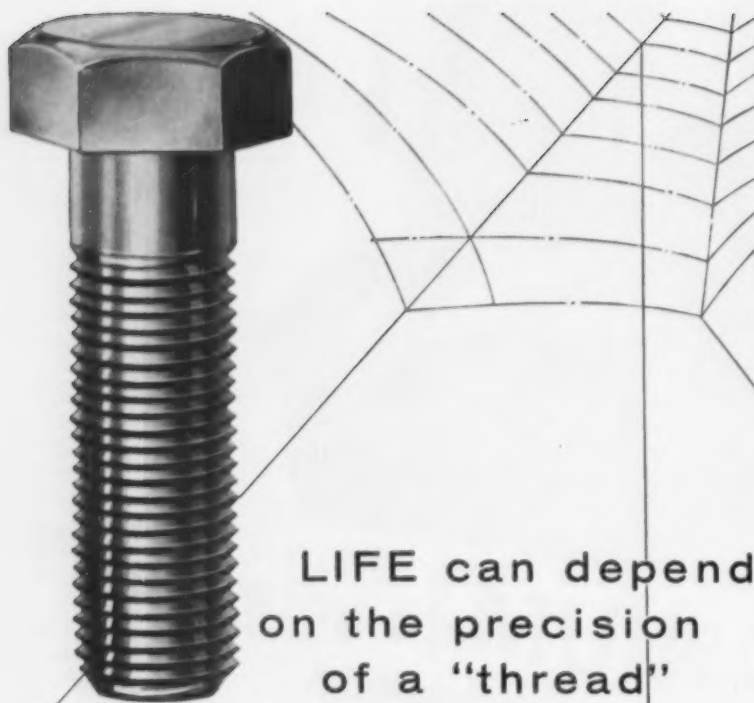
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PERSONNEL

George E. Gullen, Jr., appointed director-labor relations, **American Motors Corp.**, Detroit.

Charles H. Kraft, appointed regional credit manager, U. S. Steel Supply Div., **U. S. Steel Corp.**

C. C. March, appointed general manager-coated abrasives and related products division, and **R. W. Mueller** as general manager-fibrous and industrial tape division, **Minnesota Mining & Manufacturing Co.**

Frank P. Lucier, appointed assistant sales manager, Stanley Electric Tools, a division of the Stanley Works, New Britain, Conn.

William A. Davis, Jr., appointed sales representative, **Roll Formed Products Co.**, Youngstown.

Pat E. Dougherty, appointed district sales representatives, Leachen Wire Rope Div., **H. K. Porter Co., Inc.**

Carl W. Dobos, plant manager, Framingham, Mass., Buick-Oldsmobile-Pontiac Assembly Div., **General Motors Corp.**

Earl C. Petrie, appointed director of research, **North American Refractories Co.**, Cleveland.

David O. Merrill, appointed manager of sales - Container Div., **Jones & Laughlin Steel Corp.**

George B. Varner, appointed advertising manager, **Kennametal, Inc.**

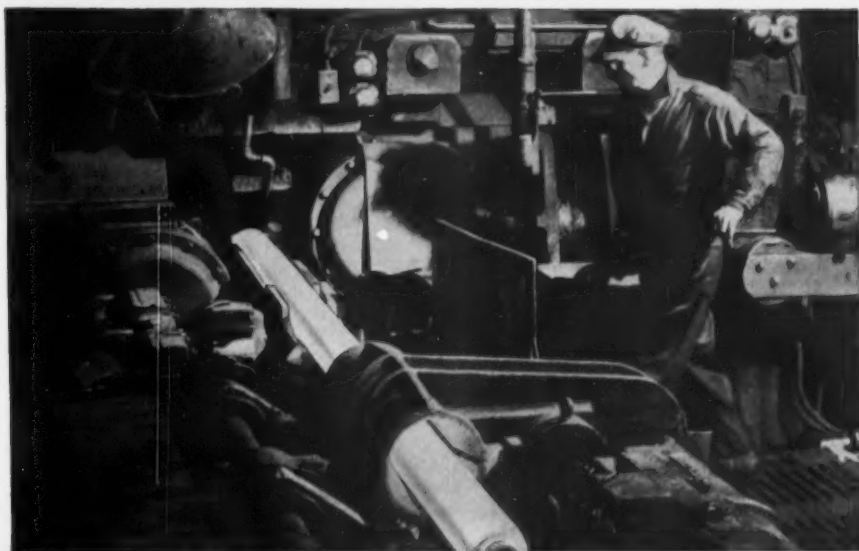
OBITUARIES

Karl Landgrebe, 78, retired head of **Birmingham Boslin Co.**, Birmingham, Alabama.

James D. Quinn, 62, vice-president in charge of sales, **Jersey Shore Steel Company**, Avis, Pa.

Gustaf A. Lillieqvist, 61, research director for **American Steel Foundries**, Chicago.

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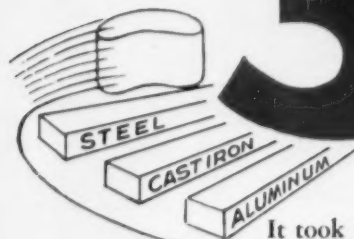
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Grinding gear case. Note how stroboscopic photo stops motion of coolant

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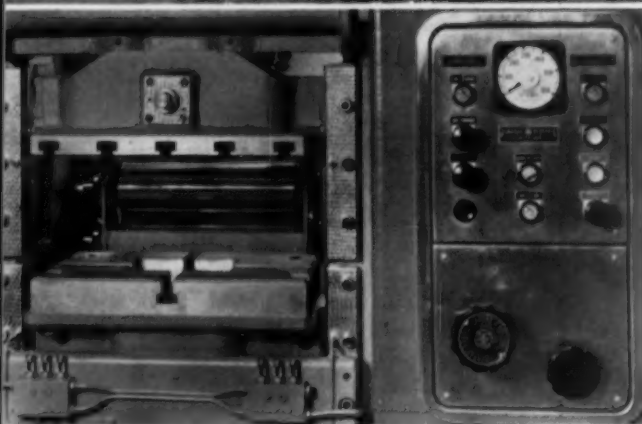
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Top: SPEED RANGES of 400 to 600 strokes per minute are achieved on this new 60-ton press.

Bottom: CONTROLS for operating 60-ton press are all conveniently located on the right front side. Measuring rolls are seen through die area, left.

♦ Blanking and shallow forming operations can be performed at 400 to 600 strokes per minute on a new, 60-ton hydraulic press . . . Press design incorporates dies which move with the strip and continuous coil feeding . . . It has no clutch or brake . . . Other advantages include less setup time, variable feed lengths and low maintenance.

By E. C. BEAUDET, Technical Editor

June 16, 1955



Coil fed continuously—

Dies Travel With Strip in New High-Speed Press

♦ BLANKED PARTS streaming forth at 400 to 600 per minute are normal production rates for a newly developed, 60-ton high-speed hydraulic press. The unit which combines the fast operating advantages of continuously fed steel and dies which move with the strip may well have a strong influence on future stamping practices in the high production industries.

The new Flying Press built by Wean Equipment Corp., Cleveland differs considerably from conventional presses of its size. It is machine-tool like in appearance, has a minimum of vibration and incorporates several new design principles.

Major applications now seen for the press are in blanking and shallow forming operations in the automotive, appliance and lamination stamping fields. Of the 8 units already sold, 5 are of

60-ton capacity, the remaining 40 tons. When installed they will perform contour cutting and perforating, lamination stamping, first operation blanking and perforating and forming on a number of carbon and silicon steel parts.

Added to high speeds, the press has other advantages such as short setup time, variable feed lengths to minimize scrap, low maintenance and downtime, greater accuracy and a miscut feature which permits its use as a cutoff device.

In conventional coil-fed stamping work, strip is supplied intermittently by a press feeder. There is no stopping or starting of the feed in the Flying Press. Strip flows continuously between the dies which move forward and synchronize with the strip movement during stamping. This permits faster output and closer accuracy in length since there is no slippage between the dies and the steel.

Minimize vibration

Die travel with the strip during stamping is not new. Several other presses using this idea have been developed before. But the Wean press puts it to use in a practical new design which causes a minimum of vibration and is very rugged in construction.

On the 60-ton press a 15-hp motor drives a pair of camshafts which cause the upper platen assembly to travel in a circular path. The lower platen is set at a predetermined height, depending on the shut height of the press, by a pair of links attached to the main frame.

The ways of the press are machined to confine the lower platen in a relative position to the upper platen. They are adjustable to reduce wear which may occur over a prolonged period. The upper and lower platens are parallel within 0.002 in. There is an adjustment of 2 in. for the upper platen to permit a required shut height of 8.5 to 10.5 in.

When driven relative to each other the upper and lower platens have the same motion as a conventional press and also a forward and backward motion with respect to the strip travel. The whole unit can be completely counterbalanced as a rotating shaft thus reducing vibration as compared with that produced in presses employing a reciprocating motion.

Setting up and adjusting the feed mechanism on conventional presses can be time-consuming. On the Flying Press a set of measuring rolls are geared into the press through a variable speed unit to obtain required feed lengths for the part. Feed lengths on a new setup are adjusted simply by turning a knob on the control panel.

The feed length can also be varied while the press is in motion. The press operator can thus set the scrap between stampings to a minimum. This normally requires a shutdown and readjustment on conventional units.

By actuating the links of the lower platen its relative height can be lowered so that contact with the upper platen does not take place. This

gives what is called a miscut. With this feature any multiple of the basic feed length can be obtained.

The uncoiler for the 60-ton press handles a 10,000-lb coil, with a maximum 24-in. width and 50 in. OD. Side disks on the unit support the coil to prevent telescoping. The uncoiler which contains a 4-roll straightener and pinch roll assembly is electrically controlled. It supplies free hanging loop to be fed into the press. No tension is ever put on the strip before its entry into the rolls. The feed rolls are an integral part of the press and are directly geared into the main drive shaft.

Because the Flying Press has no clutch or brake, maintenance and downtime are claimed to be considerably lower since these components are said to account for most press maintenance work. Energy is stored in the motion of the die and die holders at the place of work rather than in a flywheel.

Feed ranges (which govern stamping length) for the 60-ton press are 3 to 9 in. with an alternate range of 1 to 4 in. for smaller parts. The die area is 12 in., front to back, and 20 in., left to right. Forming is done to a maximum of 0.5 in. depth.

Regardless of the length used within the feed range, the number of strokes per minute remains the same. This makes the press particularly well-suited for high-speed progressive die operations, according to Wean engineers.

Use forced-oil lubrication

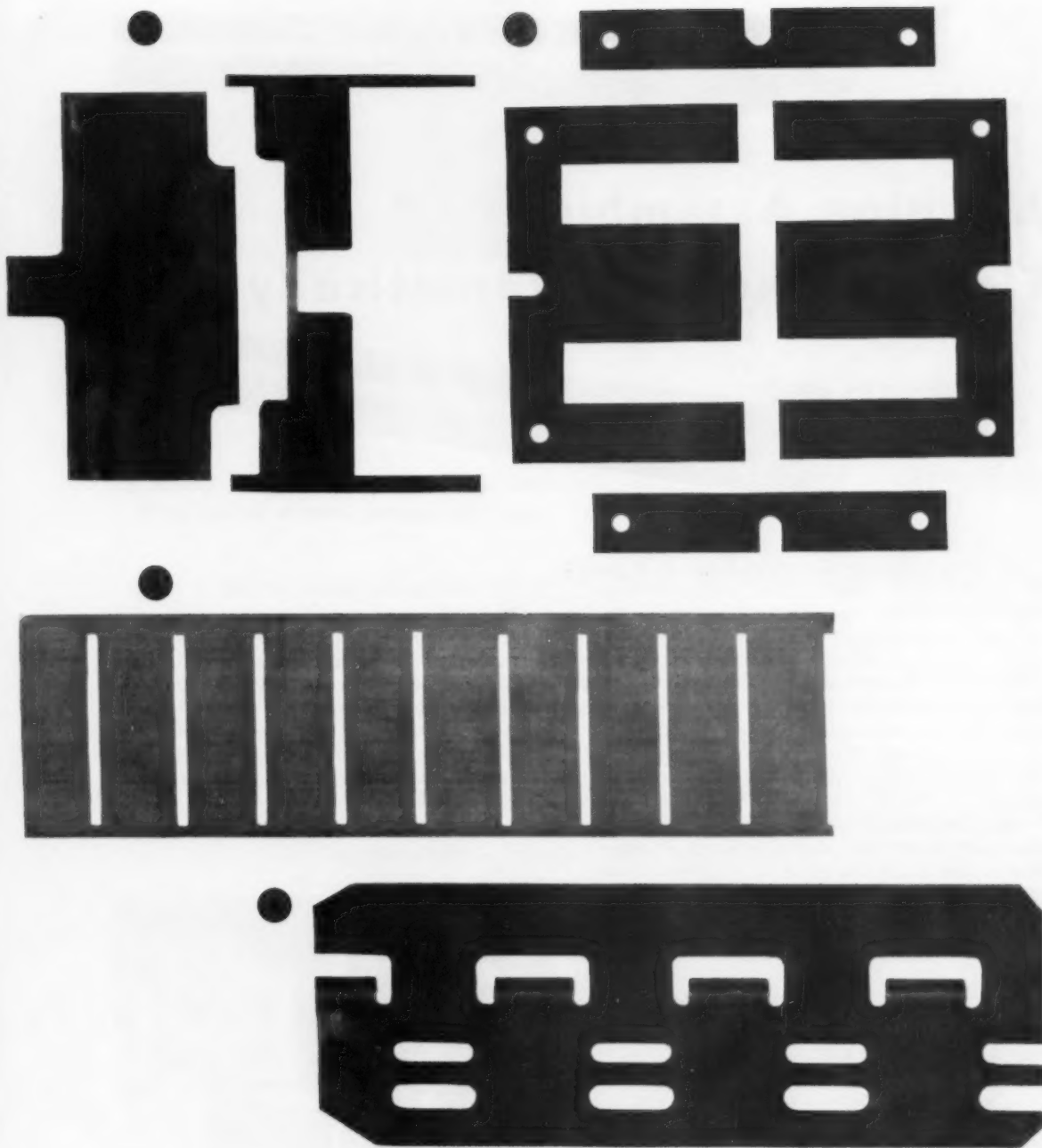
All controls for operating the press are conveniently located on a panel on the right front side of the machine. The press and uncoiler are very compact, occupy a minimum of floor space and require no foundation for the 60 and 40-ton sizes. A forced-oil lubrication system is used.

While 400 to 600 strokes per minute are normal operating rates for the 60-ton models, speeds on the lighter sizes can go up to 1200 strokes per minute with feed lengths up to 6 in. and strip speeds of 600 ft per min., it is claimed.

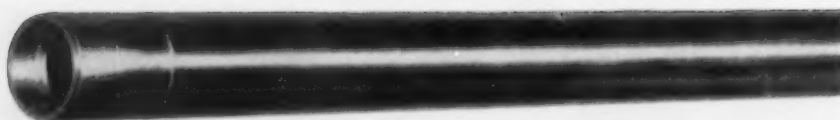
Some idea of the types of parts and the rates at which they can be produced on the 60-ton press are shown opposite. They were made at Wean Equipment's plant using customers' production dies. Rates on conventional presses of a comparable size are estimates made by Wean engineers.

While initial development work has centered on smaller-sized presses, Wean Equipment Corp. is pointing its continuously-fed press toward the mass output, larger-sized stampings such as automotive hoods, roofs and rear decks.

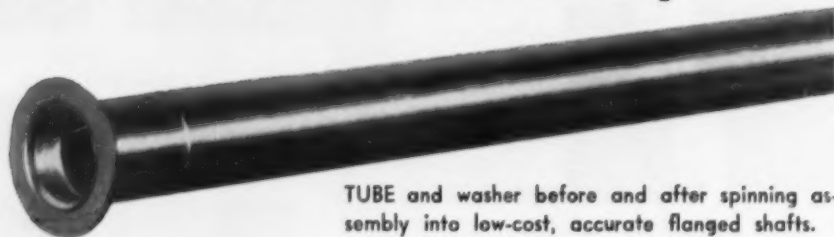
A 250-ton unit has already been designed for handling 30,000-lb coils in widths up to 72 in. wide. This is expected to bring the efficiency of high production stamping lines way up with speeds 2 to 3 times faster than present units.



- HINGE support bracket, left, blanked at 500 strokes per min on new press. Former rate was about 60. Feed length is $3\frac{1}{8}$ in., strip width $5\frac{1}{4}$ in. Scrap is shown at right.
- THREE-stage progressive scrapless lamination stamped at 450 strokes per minute compared with estimated 160 to 180 formerly. Feed is 6 in. in length.
- PIERCING operation for automotive weather stripping is done at 500 strokes per minute rate on $2\frac{7}{8}$ in.-wide strip with 9 in. feed length.
- BLANKING and forming strip for subsequent continuous roll forming operation is done with a two-stage progressive die at 500 strokes per minute on high-speed press. Feed is 2.5 in.



Machine Assembles Flanged Shafts Automatically



TUBE and washer before and after spinning assembly into low-cost, accurate flanged shafts.

♦ **INGENIOUS MACHINING** and assembly techniques make it possible for Whirlpool Corp. to mass-produce home laundry equipment at a very high rate in its expanded St. Joseph, Mich., plant. These techniques are well illustrated by one setup in which a flat stamped washer is assembled to a shoulder machined near the end of a hollow shaft. The finished part is used in the spinner basket of an automatic clothes washer.

This assembly method provides a flanged shaft of required precision at low cost. Production is 250 units per hour on a three-station indexing machine which is equipped with two Delta heads and is operated by one man. This output rate includes hand loading and unloading.

Dial indexes clockwise

Tubular shafts and flat washers reach the machine ready for assembly. Each tube has previously had one end of its OD turned to form a shoulder whose depth from the end is equal to the washer thickness. The washer has a tapered ID whose smaller diam is placed toward the tube shoulder. After this is done the tube is set into a hollow fixture at the loading position of the indexing dial and is clamped by hand.

As soon as loading is completed, the dial indexes clockwise. This brings the end of the tube below a rotating tool having two carbide rollers with convex diameters. The spinning tool lowers automatically and the rollers apply pressure against the ID at the top end of the tube. This causes the rollers to turn about their own axes as they are carried around bodily by rotation of the tool.

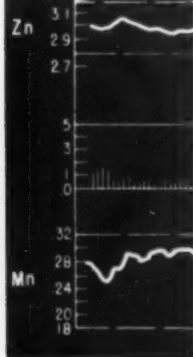
Spinning forces the metal in the tube wall outward to fill the tapered hole in the washer,

thereby locking the washer securely to the end of the tube.

After spinning is complete the tool lifts automatically and the work piece is indexed to the third station where a reamer re-sizes the bore. This is done because the flow of metal in the spinning operation closes the hole slightly. After reaming, the work piece is indexed back to the front station where the fixture is unloaded and reloaded.



ASSEMBLY machine loads at one station, right, spins with tool at left, reams with rear tool.



Faster analyses—

Direct Reading

Spectrometer

Speeds

Magnesium Production

♦ Continuous production of magnesium alloys requires close coordination every step of the way, but especially in alloying . . . Fast, accurate analyses are needed to keep metal to specification.

♦ Dow solved its problem through development of direct reading instruments for spectrochemical analysis . . . Tighter control of alloy content in a fraction of the time previously required has been possible . . . Direct readers have helped keep production stepping along briskly, cut analysis costs.

By C. A. SAUER, Spectroscopist, Madison Div., Dow Chemical Co., Madison, Ill.

♦ ANALYSIS of magnesium alloys through use of a direct reading spectrometer has given the Madison, Ill., plant of Dow Chemical Co. greater control over product quality. An outstanding advantage is the rapidity with which analyses may be made. This speed has been a key factor in maintaining continuity in magnesium casting operations.

In early magnesium production, alloying was controlled by comparing Rockwell hardness readings of samples of known composition with those of pieces cast while melting. Alloying elements were added as needed. A final batch sample was analyzed on a conventional spectrograph, or by wet chemical methods. Values obtained were used to determine whether or not the batch conformed to specification. Normally, this required that the batch be held for one or two days or more.

With increased acceptance of magnesium as

a structural metal, the development of new alloys, and the planned addition of direct chill continuous casting facilities at Midland, a more reliable and faster method was needed for control of analyses. Production of some alloys required control analyses within a few minutes of casting time. Although spectrographic analysis with a conventional photographic instrument was rapid compared to chemical methods, it could not meet the desired time requirements.

The problem of developing a more rapid method of analysis was referred to the Dow Spectroscopy Laboratory. By using electron multiplier photo tubes the first direct reading spectrometer was built. In 1945 this instrument was put to work in the Midland Alloy Plant. Equipped with eleven photo multiplier tubes it allowed determination of ten elements.

When Dow started construction of additional magnesium facilities at Madison, Ill. in 1951,

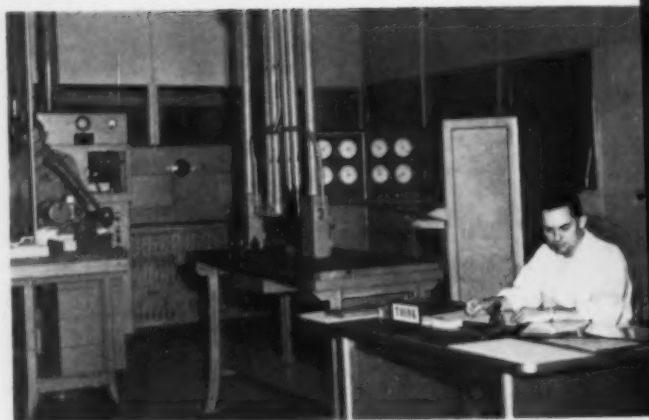
a Baird Associates Dow Direct Reading Spectrometer was installed. The Madison Alloy Plant has several melting lines feeding a continuous rolling ingot caster, continuous extrusion ingot casters, an intermittent caster, and a pigging machine. The intermittent unit handles experimental, and special orders. The pigging machine produces foundry ingot for sand, permanent mold, and diecasting operations.

The metal is pumped from a casting pot into a mold. To keep the process constantly in operation pots of metal must be kept alloyed to specification and ready to be pumped into the casting pot at all times. Depending on the size of the mold, it is possible to cast as much as several tons per hour in each unit. This casting rate makes the analytical speed of the Direct Reader one of its biggest assets. Within a few minutes of the time a charge is melted in, an analysis can be made and alloying started.

Samples are taken from each step in the alloying process and sent to the laboratory by pneumatic tube. The final or batch sample is taken on a basis of weight of metal cast.

Samples run in duplicate

A sample is obtained with specially designed sampling gun and glass tubes. The gun has a plunger arrangement which, when released, draws metal up into the glass tube. The speed at which the sample is drawn into the tube can be regulated. This rate of flow is a control of the rate of chilling, and provides some control of metallurgical structure from sample to sample. The samples are about 5mm in diam and 90mm long. At the laboratory pins are machined to a controlled size and shape on a

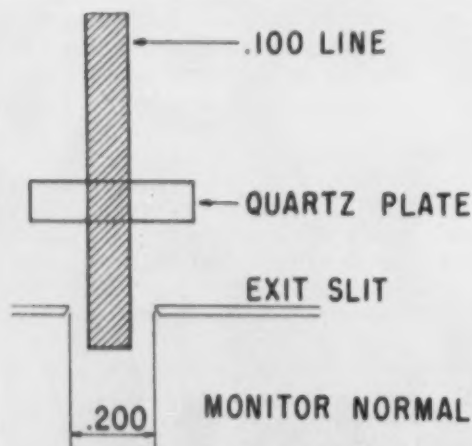


LABORATORY showing new Dow Baird spectrometer and pneumatic tube station from Alloy Plant.

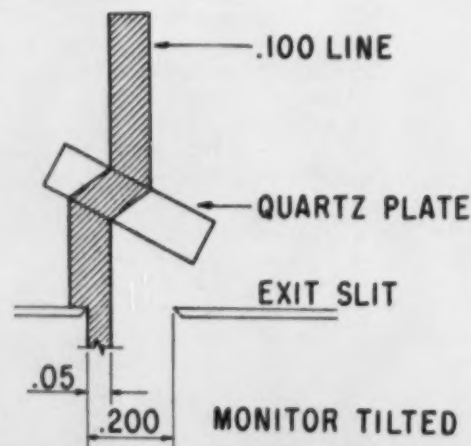
simplified lathe. The operator inserts the pins in the electrode clamps of the spectrometer, pushes the start button, and the test cycles automatically.

Each sample is run in duplicate and the average reported. The first sample from a pot is accompanied by a charge slip. Based on this information and the analysis of the pins alloying additions are calculated. After the alloying additions have been melted in, a check sample is taken. If the additions were completely effective, the metal is released to the casting pot. If not, necessary adjustments are made.

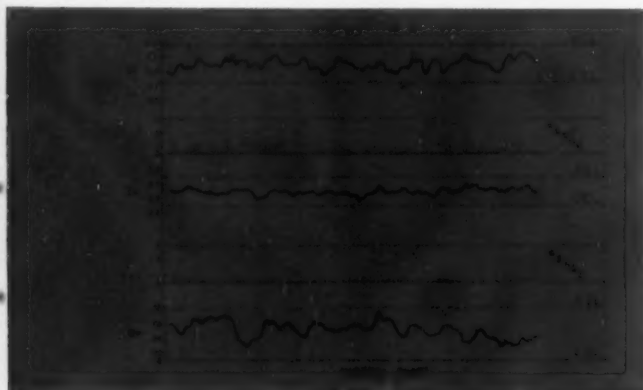
Performance and efficiency of the alloying operation are carefully watched. The moving average and range of all alloying and impurity elements are plotted for each batch sample.



RELATION of element line to spectrometer exit slit can be checked with simple monitor.



AS QUARTZ PLATE is turned the direction in which lines are displaced can be determined.



CONTROL limits for AZ63 alloy are well within the allowable specification range.

Control limits were computed using data obtained chemically and spectrographically on approximately 500 samples and cover a narrow band in the middle of the specification limits. The graph, above, demonstrates the application of control charts to AZ63 alloy. For example the aluminum specification for this alloy is 5.5 to 6.5 pct. The calculated control limits for aluminum are 5.75 to 6.25 pct. Holding the process to a narrow range in the specification results in a more uniform product.

The Direct Reader, a standard Baird instrument with modifications, is housed in an air conditioned laboratory. Temperature is maintained at $76^{\circ} \pm 2^{\circ}\text{F}$ and humidity at 45 pct ± 5 pct to maintain optical stability and constant spark source characteristics. For maximum optical stability, interior temperature of the spectrometer case is held constant 8°F above room temperature.

To determine that the element lines pass through the centers of the instruments exit slits and to permit precise adjustment, a monitor which works in conjunction with a recording device was installed. This simple device can measure the position of spectral lines within one or two microns. Developed in the Dow Spectroscopy Laboratory, and first used on the Madison instrument in 1951, it is now an accessory on Baird spectrometers.

Monitor provides simple check

The monitor consists of a small quartz plate mounted in front of the slit for zinc at 4810\AA . The quartz plate can be rotated through a predetermined angle by a small motor. The zinc line is 100 microns wide and the zinc slit is 200 microns wide. If the line is exactly centered, there should be 50 microns from each edge of the line to the edges of the slit.

To make this measurement, it is only neces-

ELEMENTS AND CONCENTRATION RANGES DETERMINED BY THE DIRECT READER

COLUMN A		
ELEMENT	CONCENTRATION RANGE, Pct	
Al	0.001	11.00
Mn	0.001	2.50
Zn	0.001	7.00
Cu	0.001	0.30
Si	0.001	1.00
Fe	0.001	0.02
Zr	0.01	1.00
Be	0.0001	0.005
Ca	0.01	0.30
Pr	0.1	1.00
La	0.01	1.00
Nd	0.4	2.00
Ce	0.01	2.00
COLUMN B		
ELEMENT	CONCENTRATION RANGE, Pct	
Sn	0.001	8.00
Pb	0.001	0.01
Ni	0.001	0.01
Ag	0.001	1.00
COLUMN C		
ELEMENT NOMINAL, Pct	STD. DEVIATION BETWEEN D. R. & CHEM., Pct	
Al 6.00	0.15	
Zn 3.00	0.12	
Mn 0.25	0.014	

sary to expose a sample containing some readily measurable amount of zinc, and record this value. The monitor motor then rotates the quartz plate. The thickness of the plate and the angle of rotation have so been selected that the zinc line will be displaced 100 microns. In this position, only 50 microns of the line will pass through the slit to the photo tube. The value obtained should be one-half of that obtained when the quartz plate was normal to the line. Any value more or less than one-half of the original value will show in which direction the lines are displaced from the slit centers.

A simple calculation will determine how much it is displaced. To correct the position of the lines on the exit slits, a small mirror located between the entrance slit and the grating can be rotated. Rotating this entrance mirror has the effect of changing the position of the entrance slit as viewed from the grating. The position of all the spectral lines change a corresponding amount in the opposite direction.

To measure spectrometer performance, excluding the source, a constant voltage checking device is used. Output of the high voltage supply is fed through a system of voltage dividers directly into the storage condensers. The spectrometer is put through a measuring cycle each shift.

At half the power cost—

New

Welding Process

Deposits Metal Faster

♦ Submerged-arc welding technique can deposit more metal in less time . . . Greater efficiency is achieved by reducing energy losses . . . Production can be tripled using a new method of welding that can be adapted to existing systems . . . Larger transformers may be required.



EXPERIMENTAL setup for the new, fast deposition I'RT welding method at B & W research center.



CONVENTIONAL automatic welding with 3/16 in. rod at rate of 18 to 20 lb per arc hour.

♦ A NEW automatic submerged-arc welding process which will deposit metal up to five times as fast as comparable welding methods and at half the power cost, is in final stages of development at Alliance, Ohio, Research Center of The Babcock & Wilcox Company. Known as the I²RT method, the new process is also applicable to inert gas shielded welding.

Standard submerged-arc welding practices have been based on the principle that deposit rate is directly proportional to the diameter of the electrode. This theory holds true with flux-coated electrodes, where current density is limited. Tests determined that desired weld patterns could be made at deposit rates that were inversely proportional to wire size for a given current. In one case a higher deposit rate was obtained with a 3/32 in. diam electrode at 650 amp than with a 1/4 in. electrode at 800 amp.

Subsequent tests showed that the deposit rate at high current density is directly proportional to the length of the electrode wire from the contact shoe to the arc. This discovery led to the I²RT principle of submerged-arc welding which involves preheating the electrode almost to its melting point prior to entering the arc.

The arc does not have to supply the sensible heat required to bring the metal to the melting point, as it does in standard submerged-arc processes. The energy absorbed by the elec-

trode at the arc supplies heat of fusion to melt the metal.

Energy required to heat the electrode to the melting point is measured in terms of the square of the current (I^2), the resistance (R) of the electrode wire projecting from contact nozzle to arc, and the time (T) that current flows through a given cross section of wire.

The new welding technique uses current densities in the range of 70,000 to 270,000 amp per sq in. which are possible only with submerged-arc or inert gas welding. Such high current densities would damage flux-coated electrodes.

Use of alloy wires likely

Carbon steel wire electrodes are currently used for production work, though experiments indicate the new process can make use of alloy electrodes with equal success. The major difference involves the electrical resistance which is higher in the alloy grades.

In operation, a voltage-sensitive relay controls the length of electrode projecting from the nozzle. Changes in load voltage are received by this relay, which signals the raising or lowering of the weld head.

The wire is fed through a granular flux composed of finely divided metal oxides. A flux depth of 1 to 1½ in. is maintained. To keep pace with rapid metal deposition required development of a special guiding device that "trues up" the weld head and arc with the work. Beads are deposited too fast for accurate manual guiding.

The new process claims to be faster, more efficient, and more economical than comparable commercial techniques. Faster, because with a current input of 1000 amp it can deposit metal up to 100 lb per hr. This is better than three times as fast as previous processes.

Its claim of greater efficiency is based on the fact that all of the energy is applied directly in the electrode to heat the wire. There is no dissipation of energy in melting base plate and heating flux. Using 2½ times as much energy as present welding processes, the new technique can melt five times as much weld metal.

The resulting improvement in efficiency is reflected in reduction in costs. Test results show that I²RT uses 0.65 kw/hr per lb of electrode. Comparable welding methods consume approximately 1.2 kw/hr to weld the same amount of filler.

Conversion of existing welding equipment to I²RT would consist mainly of installing suitable transformer capacity and increasing the rate of feeding the wire electrode. Since the new process needs double the load voltage formerly required, it would be necessary to provide larger or additional transformers. Travel speeds would also have to be increased.



CROSS SECTION of welded butt joint using new process. Deposit rate is 120 lb per arc hour.

For better castings—

Blown Shell Cores, Molds Produced At High Rates

♦ Shell molds and shell cores can be blown at rates to 240 pieces per hour in this new machine . . . A unique flexibility is achieved in shell mold and core production by combining electrically heated split patterns or molds, sand-resin blowing equipment, and a heated mandrel.

♦ Hollow cores with excellent venting and collapsibility characteristics can be readily produced without drier plates and ovens . . . Standard equipment occupies only 24 sq ft . . . Contoured molds may be easily stacked, eliminating need for backup materials.

By W. G. PATTON, Asst. Technical Editor

♦ VOLUME or medium run production of shell molds and shell cores, separately or simultaneously, is made possible by a new machine developed by C & S Products Co., Detroit. Under development for several years, the new machine has just gone into production.

The "Blo-Core" shell machine blows resin-coated sand into electrically-heated, split core boxes to produce shell cores. Similarly, shell molds are produced by blowing the resin-sand mixture into heated patterns or die cavities. Complete curing is achieved in 10 to 30 seconds depending on the thickness of the blown shell.

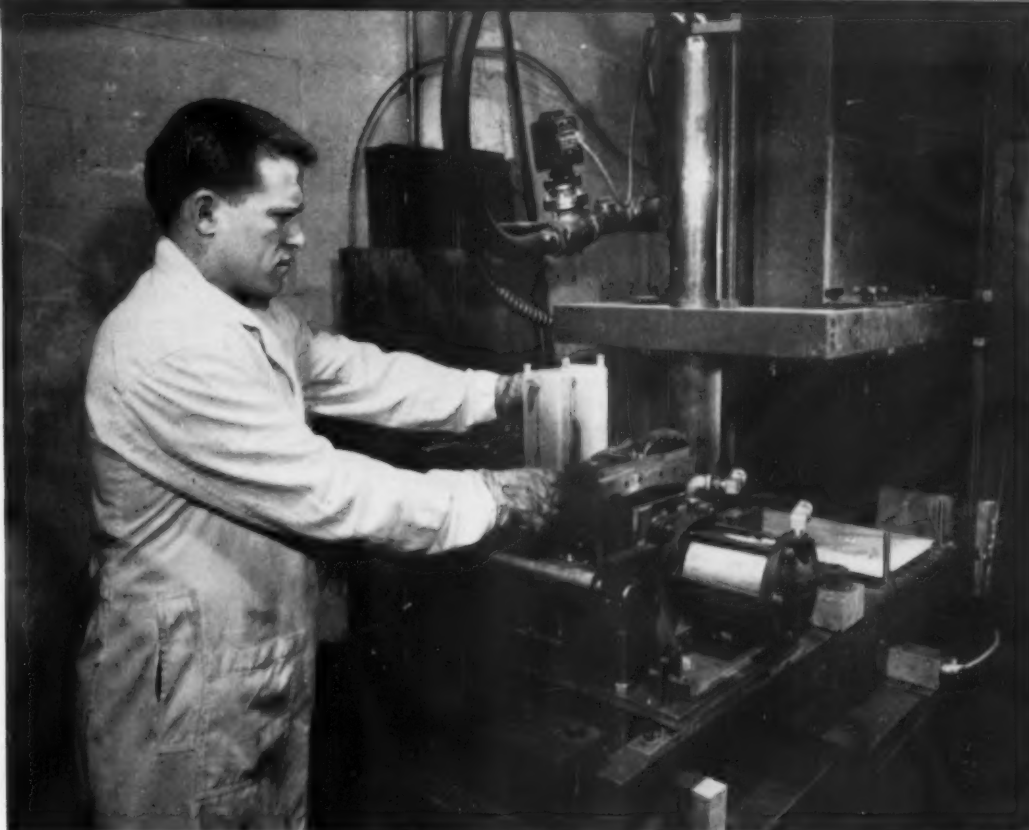
Multiple core boxes can be used to achieve production rates up to 240 cores per hour. In the case of core-making, the need for drier plates and ovens is entirely eliminated.

Cores can be made hollow, if desired, saving

weight and adding desirable venting characteristics. Outstanding advantages of shell-blown cores include high accuracy and ability to achieve smooth internal surfaces in castings. These properties are attracting considerable attention in the automotive industry.

Another feature claimed for the machine is the ability to produce contoured shell molds in which both cope and drag impressions are made in the same mold. This facilitates stacking of molds, thereby making it possible to pour castings in multiples. Contoured molds may also eliminate the need for backup materials as well as minimize sand and resin requirements.

Thermostatic control within 10°F is made possible by the use of thermo-switch units inserted in the core boxes or patterns.



REMOVING a shell liner from the machine. Dies may be split either horizontally or vertically and heated cores inserted if desired.

The standard machine accommodates core boxes or patterns up to 15 x 20 in. Maximum height is 36 in. for the present machine.

Operation of the machine is simple and can be handled readily by unskilled labor. A button is pushed to close the pattern halves and start the production cycle. Rotating 180°, the patterns are aligned automatically under the nozzles of the blowing machine. The mix is blown into the pattern from above. Flow of sand is stopped automatically by predetermined timing cycles.

Returning to their original position, the pattern halves open automatically. The stripping operation is also fully automatic. The only manual operation is lifting the shell after it has been stripped from the pattern.

Nozzles blow automatically

Time required to blow a shell is 1 to 5 seconds. Curing the shell requires 10 to 30 seconds. Through the use of timers and limit switches, the cycle is positively integrated into a two-station rotary interlocked operation.

Simultaneously with the return of the patterns to their original position, a slide plate permits charging of the blowhead with coated sand. Nozzles are designed to blow automatically but only when in contact with the dies.

Nozzles are screwed into the universal blow-head.

A 1-in. air line is used to operate the pneumatic system of the machine. Solenoid valves are employed. Valves are controlled by timers and limit switches. The entire mechanism is fully adjustable to meet the requirements of a particular job.

In the opinion of several Detroit foundry experts, successful blowing of resin-coated sands into heated pattern cavities may project shell blowing into the permanent mold casting field, or related metal forms. In such applications, shell cores are used as liners, thereby greatly prolonging mold life. The economy of using shell liners in permanent molds is closely linked to the production requirements of a particular job. Careful study is needed to determine the advantages of the method in each application.

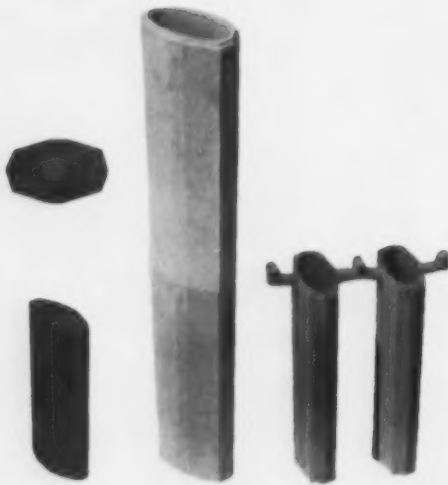
To use the shell blowing process successfully, pattern or core box design must be of the highest quality. Each job must be properly studied and engineered to achieve maximum cost benefits. This includes rigging of patterns, making proper allowance for heating, and careful handling of heated patterns or core boxes.

A thorough knowledge of the behavior of heated patterns or core boxes is necessary.

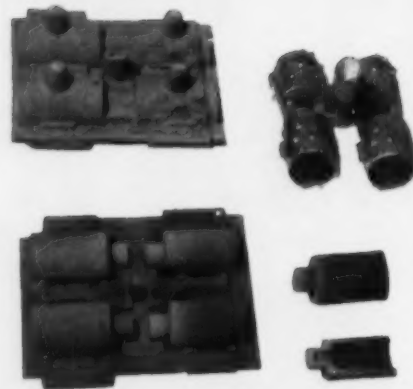
Cores and Molds



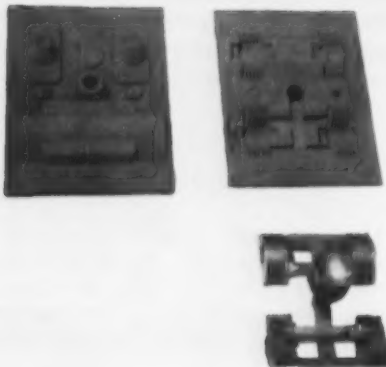
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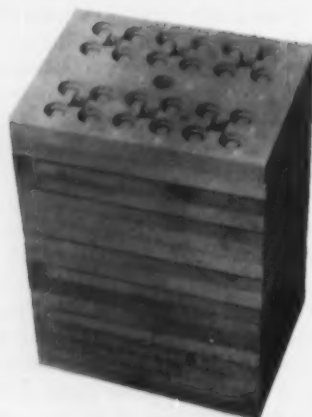
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4



5



1—SHELL LINERS used for casting plating anodes, can be linked together to pour 100 in. anodes.

2—ALUMINUM rotor housing are cast to close tolerances using blown shell molds and cores.

3—ALUMINUM adaptor, once machined from bar stock, can now be made as a casting and used as cast.

4—HOLLOW propeller hub core yields closely dimensioned casting also acts as hot metal reservoir.

5—TWO PATTERN halves are used for blowing shells containing cope and drag impressions on opposite sides. Shells can be stacked for pouring.

Since heating temperatures of the pattern are relatively low—in the range of 500°F—metalurgical problems resulting from the effects of heat on the patterns are not severe.

Several advantages are claimed for blowing coated sands to make shell molds and shell cores. The amount of mix, it is contended, is always under tight control and the least amount of sand-resin mix is employed to the fullest advantage. This tends to reduce resin cost.

The new process also permits the production of accurate, hollow cores which, in some instances, are only one-third the weight of conventional sand cores. There is the further advantage of close dimensional tolerances which can be held within ± 0.004 in. per in.

Superior venting claimed

Another argument favoring shell cores is superior venting and ability to control collapsibility within desired limits.

A number of foundry observers believe the new process may greatly change core-making techniques. Ultimately, it is contended, the new method may be instrumental in producing castings to accuracies and surface finishes that have not been possible heretofore.

Cost of shell cores compares favorably with conventional sand cores, according to C & S engineers.

Elimination of driers and baking ovens is an outstanding advantage of the new process. Valuable floor space is saved and related handling equipment is eliminated. The "Blo-Core" shell machine can be positioned, as an integral part of the molding line. Cores can be blown and immediately set into green sand, permanent, or shell molds prior to closing.

Shell molds made by blowing into heated pattern cavities can be contoured to desired shape. A minimum amount of sand is placed where it will perform maximum service. Thus, heavy shell sections can be used where the mass of the casting is concentrated. Bosses, pressure points or strengtheners can be made a part of the mold. This may also make it possible to eliminate the use of backup material.

Bonding agents or clamps often used to hold the shell mold halves together may frequently be eliminated. Conventional foundry weight can be used to hold the mold halves together.

A typical case history illustrating the use of the shell blowing process is offered by recent experience in the production of nickel and copper anodes for the plating industry. This development started with the design and manufacture of a basic blowing machine to fit the job. Next came design and engineering of pattern cavities to produce shell liners or "tiles" for holding the molten metal.

The tiles are 10 in. long and are designed to dove-tail at the open ends and act as linkages. In this manner, as many as 10 tiles are

joined together to form a liner 100 in. long. The completed liner is then inserted into a backup mold. The hot metal is vertically cast with the liner in this position.

It is interesting to note that 0.010 in. draft is sufficient to permit stripping the 10 in. long tile from its die cavity. As in other applications of the shell blowing process, patterns are electrically heated. A heated mandrel is used to form the inner surface of the tile.

The Blo-Core shell machine has been used to make tiles for more than 6 months. The present machine turns out as many as 240 tiles per hour. The equipment cycles automatically. The only manual operation is removal of the cured shells every 20 seconds.

Resin-coated sand is used to make the shells. The sand contains 2 to 4 pct resin, depending on the type of metal being poured.

The machine can use patterns parted either vertically or horizontally. Shell molds and shell cores may be made either separately or simultaneously. Since this is a 2-station machine, every available second is utilized for production. Unloading is performed while the next mold or core is being blown and cured.

A small aluminum adaptor casting with unusually thin sections has been produced successfully on this machine. The piece was formerly made from bar stock. The part was produced by several milling operations at comparatively high cost.

No clamps or bonding agent

Converted to the shell blowing process, cast bronze patterns were designed. The patterns were rigged for blowing and making contoured shell molds. All the intricacies of the pattern were readily produced, as shown. The two mold halves are booked together, with the parting line acting as locators. After make-ready for pouring, a weight is placed on the contoured top shell. No clamps or bonding agents are necessary.

A third example of the use of shell blowing is an aluminum housing casting. Formerly a permanent mold operation, this job was converted to the new method. Again, cast bronze patterns were rigged for blowing. Electrical heating elements are used. Contoured shell molds are made easily and rapidly by the new method. Patterns are designed to produce hollow cores, using heated mandrel. Both molds and cores are produced to very close tolerances. Pouring is readily accomplished by using weights, but backup, clamping or bonding of the shells is not required.

In each example mentioned, careful development steps were taken prior to going into production. In these applications, the basic principles of shell blowing have been proven to be economically sound.

Singles or stacks—

Unwieldy Metal Sheets Handled Neatly by Automatic Machines

♦ Manual handling of sheet metal is usually a costly and disagreeable job . . . Where production volume is large, automatic machines will do the work faster and at less cost.

♦ "Feeders," "turnover" machines, "pilers" and other types of equipment can be made to do practically any sheet metal handling job . . . They'll process sheets singly, or in stacks.

♦ **HANDLING LARGE QUANTITIES** of sheet metal manually can be costly to management and a tiring, unpleasant task for plant workers. But these disadvantages can be reduced or eliminated by automatic handling equipment designed to feed, turn over and even stack metal sheets at high speeds.

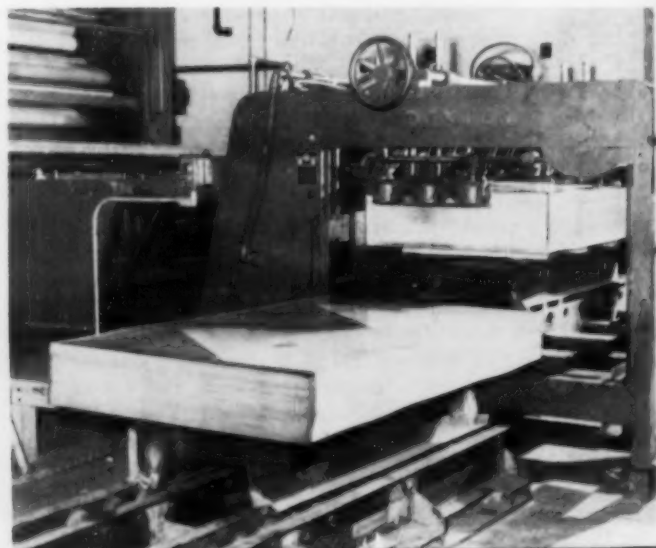
Such equipment does all three of these sheet-handling jobs in high speed painting, lithographing and drying operations at the Inland Steel Container Co. plant in Chicago. Steel sheets 50 x 77 in. in size, up to 14 gage in thickness and weighing 35-50 lb each, are moved mechanically through production lines at the rate of about 4200 per hour. After being painted and printed they are fabricated into large drum-type containers.

In planning the high speed production lines, sheet-handling problems were turned over to the Dexter Folder Co., Pearl River, N. Y. This firm designed and installed two "feeders," one "piler," one "turnover" unit and also some special conveyors for in-between handling.

Although both feeders function alike, one serves the litho press and the other delivers sheets to the paint rolling machine. Described in the simplest terms, a feeder receives heavy stacks of metal sheets via lift truck and roller conveyor. A hydraulically operated elevator table then lifts these stacks to the height of the press or paint machine bed.

The elevator may be dropped quickly to re-

METAL sheets are fed one at a time from elevated stack in feeder (right) to lithographing press (left). Bundle of sheets on conveyor in foreground will enter feeder elevator as soon as the previous stack is fully depleted.



ceive a new load and raised quickly to engage the load with automatic feeding devices. Under operating conditions the feeding mechanism automatically controls load elevation.

This is accomplished by a governor valve, operated by a ball plunger which the stack engages as it elevates. As the ball plunger is raised it operates control valves. These regulate the flow of oil through the hydraulic system so that the elevator stops rising.

At the same time the top sheet leaves the stack. When it does, the ball plunger drops down and operates another hydraulic control. The stack rises again, slightly, raising the ball plunger and affecting the hydraulic system so that elevation is arrested at the proper point.

One of the difficulties a feeder must overcome is a tendency to feed more than one sheet at a time. To prevent this, and to help lift the top sheet off the stack, the Dexter unit uses permanent horseshoe magnets. Three of these are mounted at each side of the stack as it feeds, and the magnet ends are placed perpendicular to the edges of the sheets.

Each sheet thus becomes magnetized, with areas of given polarity opposing like polarities at corresponding areas of adjacent sheets. Since likes repel, the tendency of the top sheet is to float right off the stack. Vacuum cups, a set of rollers, and endless rubber belts then move the sheet ahead for painting or printing.

When the painted and printed sheets eventually emerge from the litho press in a horizontal position, they feed singly into wickets on a paddle wheel-like device. This revolving unit "up-ends" each sheet and stands it on edge for a conveyor trip through a drying oven.

As sheets reach the discharge end of the oven they are again laid flat and also removed by a Dexter "oven end stripper." Sheets that are ready for drum fabrication are delivered directly to a "piler" by the oven end stripper.

The piler collects a stack of sheets and automatically lowers them to a position where they can be picked up by fork lift truck. This stack-lowering is done in the same way that the feeder units elevate their loads.

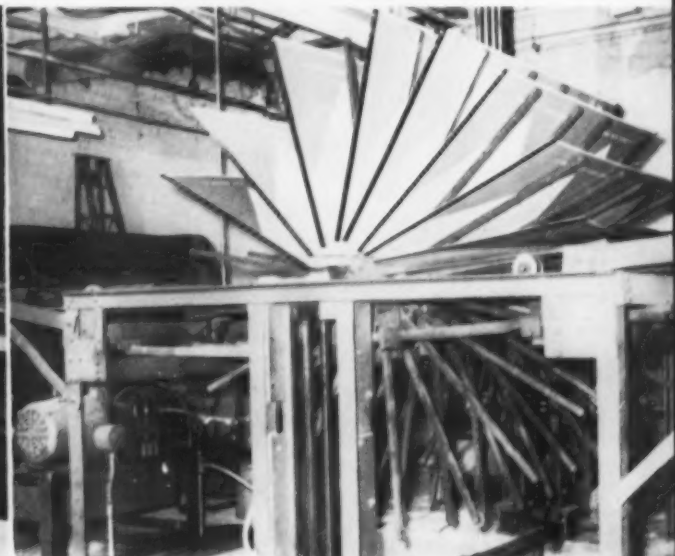
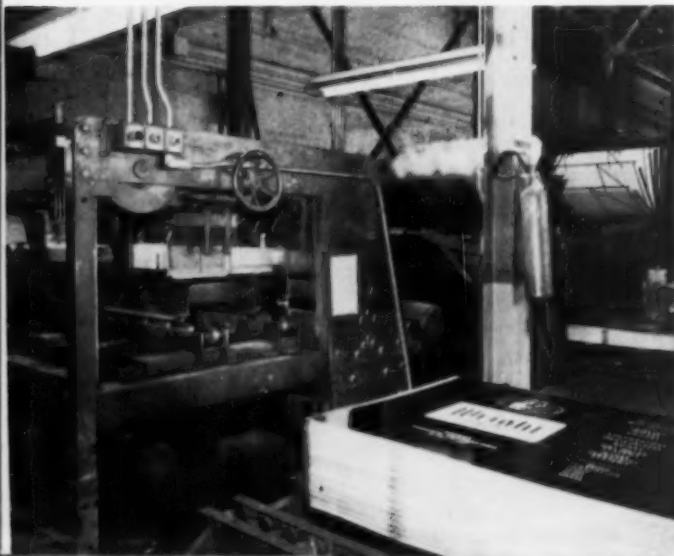
But where oven-dried sheets must be returned for additional printing or coating, their flat, upside down positions in the oven end stripper must be reversed once again. To do this, a "turn-over" machine is installed between the oven end stripper and the piler. This is simply another large paddle wheel-like device that flips the sheets right-side up before it delivers them to the piler.

If the turnover operation is not required, as in the case of ready-to-form sheets, the device is lowered into a pit so that sheets can pass directly from the oven end stripper to the piler.

Similar sheet handling equipment is also used advantageously with slitters, presses, shears, buffing machines, cleaning lines, and other high speed manufacturing operations.

SINGLE printed sheets travel on edge through drying oven (rear), are automatically placed flat as they emerge. Automatic turnover unit (behind pillar) flips dry sheets right-side up before delivering them to the piler (left). Sheet bundle is lowered to conveyor (lower right) where a fork lift truck carries it away.

TURNOVER machine rises from pit between drying oven and piler, turns sheets face up before they are piled for further painting or printing. If oven-dried sheets are ready for drum-forming, turnover unit stays below floor level.



Zinc Diecastings

Withstand High Pressure

♦ **ZINC DIECASTINGS** satisfy an unusual pressure requirement in an 8-qt capacity oil filter unit produced by Los Angeles (Calif.) Die Casting Co. The unit is designed for use with truck, tractor, marine and stationary engines. The zinc alloy used is capable of withstanding oil pressures up to 300 psi, even at freezing temperatures.

The filter housing consists basically of a zinc die-cast body and zinc die-cast cover. These parts are unique for two reasons: (1) extreme metal density must be attained in spite of the unusual size of the die castings (body weighs 10 lb and cover weighs 5 lb); (2) both the external thread on the body and the mating internal thread on the cover must be cast without being bisected by parting lines.

The density required to withstand high pressures is achieved through use of a special die casting machine which applies holding pressures over 120 tons, and also through extremely careful control of the metal's alloying con-

stituents. The cast-in threads are produced with a threaded ring die segment which is unscrewed from the casting after removal from the die.

The extremely high pressure requirement develops from the fact that some types of engine oil pumps produce pressures as high as 120 psi. A 250 pct safety factor is specified because the system is designed with no by-pass or check valve to protect the case from still higher pressures which might conceivably develop. In addition, neither leakage of oil nor loss of pressure can be tolerated.

Cast of Zamak #5 alloy, the cover and body castings are produced in individual single-cavity dies. The cavities are machined into solid steel die blocks. No leakage can occur at the cover-to-body joint because the cast-in mating threads permit thorough tightening in assembly. Pressure-tightness is insured by means of an O-ring gasket, the grooves for which are also developed during casting.



THREADS are cast-in on body and cover of this zinc die cast, pressure-resistant filter unit.

Newport Steel

.....THE CUSTOMERS' MILL

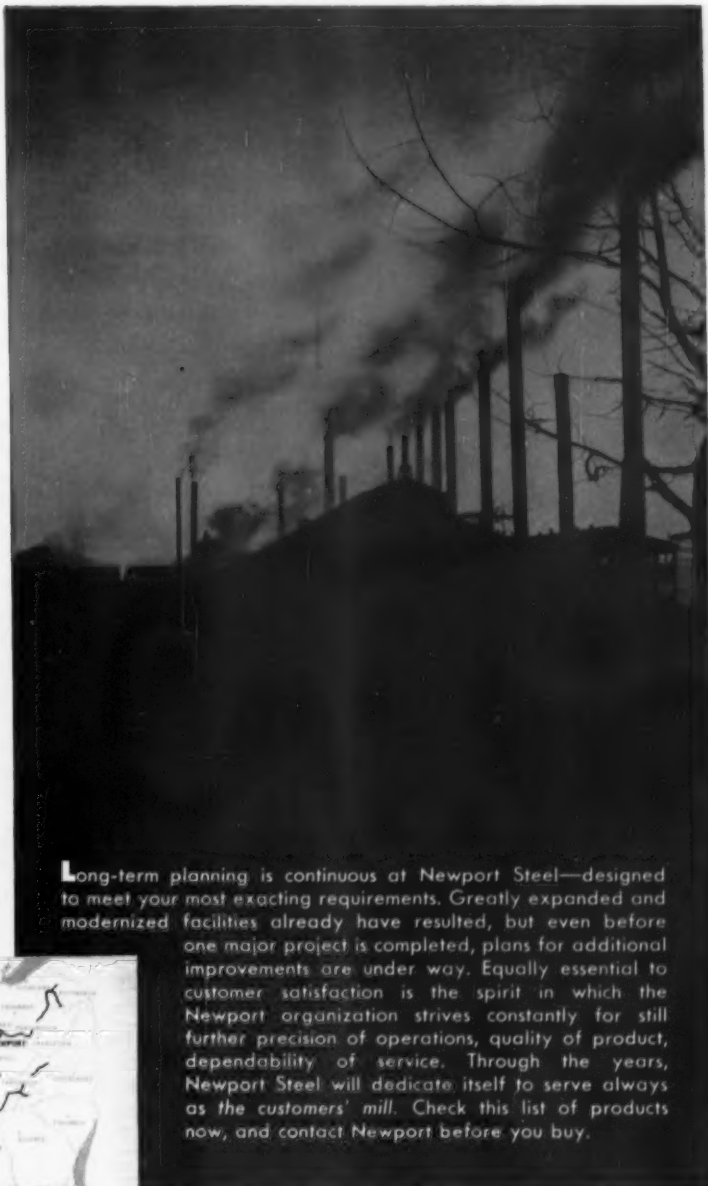
PRODUCTS OF NEWPORT STEEL

Cold-Rolled Sheets
Hot-Rolled Steel in Coil
Hot-Rolled Pickled Steel in Coil
Hot-Rolled Sheets
Hot-Rolled Pickled Sheets
Galvanized Sheets
Galvannealed Sheets
Colorbond Sheets
Electrical Sheets
Alloy Sheets and Plates
Electric Weld Line Pipe
Roofing and Siding
Eave Trough and Conductor Pipe
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ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads, 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.



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A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

New Technical Literature:

Catalogs and Bulletins

New products

A 4-page booklet lists 44 colloidal and semi-colloidal dispersions for the metalworking, foundry, and related industries. These products include dispersions of graphite, molybdenum, disulfide, mica, vermiculite, zinc oxide, and acetylene black. Carriers and diluents are given for each product, along with typical applications. Eight entirely new dispersions have been added to this latest revision of Acheson's product list. *Acheson Colloids Co., Div. of Acheson Industries, Inc.*

For free copy circle No. 1 on postcard, p. 105.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 105.

New casting process

A bulletin on Ceramicast (R), a new casting process, is available. This process uses ceramic molds to produce castings with the follow-

ing advantages: smooth surfaces; intricate shapes, of complex casting design and detail; thin metal sections; close tolerances; reduced machining costs; lower production costs. *Lebanon Steel Foundry.*

For free copy circle No. 2 on postcard, p. 105.

Deep drawn boxes

The new 1955 catalog lists over 1000 sizes of drawn metal boxes, all available without tooling charges. These precision drawn aluminum boxes are widely used by manufacturers of electrical, electronic and similar instruments as cases and housings. Smaller sizes are used as chassis, shields, junction boxes and similar purposes in the instruments themselves. *Zero Manufacturing Co.*

For free copy circle No. 3 on postcard, p. 105.

Machine shop vise

A heavy-duty 6 in. machine shop vise is described in an illustrated bulletin. It is available with swivel, complete with graduated base, 180°, plain with clamping ears for swivel; or plain, with ground sides. A separate intermediate jaw permits two holding positions at one time. Information on attachments and specifications included. *The Product Machine Co.*

For free copy circle No. 4 on postcard, p. 105.

Industrial trucks

The complete range of industrial trucks made by Baker-Raulang is given in an 8-page catalog. Included are electric crane trucks and battery-powered fork trucks. Also included are the Gas-O-Matic, which combines the best features of gasoline power and electric drive; and the Baker Traveloader, a side-loading handling and carrying truck. *Baker-Raulang Co.*

For free copy circle No. 5 on postcard, p. 105.

for hard-tough-dense concrete repairs..



Non-Shrink EMBECO PRE-MIXED MORTAR

Outlasts and outwears plain cement-sand patches because...

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- Does not shrink upon hardening.
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- Tough iron particles serve as reinforcement.
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- Hard—contains no asphalt.

EMBECO PRE-MIXED MORTAR IS READY TO USE—you add only water.

Used to patch cracks, disintegrated and worn concrete floors, walks, steps, walls, etc.

Write for 4 page folder illustrating many applications.

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FREE TECHNICAL LITERATURE

Cleaning operations

A bulletin on cleaning steel drums in reconditioning has been issued. This well-illustrated publication shows how airless abrasive blast cleaning is being used at many plants. Four case histories are presented, as well as photographs of typical machines in use. *American Wheelabrator & Equipment Corp.*

For free copy circle No. 6 on postcard, p. 105.

Magnetic ingot iron

A 24-page illustrated manual on Armco magnetic ingot iron for D-C applications is available. It covers a wide range of subjects, including magnetic core uses, mechanical and physical properties, magnetic properties, permeability, annealing practice, machining, welding and drawing. The booklet details and pictures many diverse applications. *Armco Steel Corp.*

For free copy circle No. 7 on postcard, p. 105.

Simplified steel terms

A 32-page dictionary of steel terms of particular value to men who buy or use cold finished steel bars is available. Included are more than 180 relatively detailed definitions frequently used in the purchase, manufacture, treating, machining and finishing of steel. More than 30 photographs, curves and tables are included. *LaSalle Steel Co.*

For free copy circle No. 8 on postcard, p. 105.

Heating unit

A 3 KW high frequency induction heating unit is described, for brazing, soldering, and other light heat treating applications. It is also used for quickly melting small quantities of ferrous and nonferrous metals for spectroscopic analysis, etc., in research laboratories. *Lindberg Engineering Co.*

For free copy circle No. 9 on postcard, p. 105.

KU flow meter

Described in a new folder is the Commander KU flow meter, a new industrial instrument for the measurement by differential pressure of the flow of water, steam, oil, air, gas or other fluids. Standardization of parts simplifies servicing. *George Kent Ltd.*

For free copy circle No. 10 on postcard, p. 105.



PUT MUSCLE behind your BLAST CLEANING

Does your present abrasive have muscle enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned*. Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test — put muscle behind your blast cleaning with Malleabrasive! We **GUARANTEE** that Malleabrasive will give you lowest cost per ton of castings cleaned.

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

U. S. Patent #2184926 (Other patents pending) (R)

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FREE TECHNICAL LITERATURE

Mine roof bolts

Mine roof bolts are described in an 8-page bulletin, which tells how they provide safe, economical, efficient and quality roof bolting. This new booklet explains the six major advantages of Republic's new forged steel wedge nut and forged steel rigid shell assembly. *Bolt and Nut Div., Republic Steel Corp.*

For free copy circle No. 11 on postcard, p. 105.

Magnetic equipment

The complete line of magnetic equipment designed primarily for conveying and controlling steel and separating, retrieving and purifying ferrous materials for the metal-working industry is described in a brochure. It contains illustrations and specifications on the newest developments in this field. *Eriez Manufacturing Co.*

For free copy circle No. 12 on postcard, p. 105.

Millivolt indicators

Complete information about portable millivolt indicators is now available. A data sheet describes how these indicators are being used for temperature and calibration studies involving low voltage measurements both in the plant and in the laboratory. *Leeds & Northrup Co.*

For free copy circle No. 13 on postcard, p. 105.

Easyarc electrode

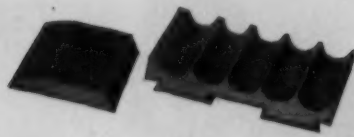
The new Easyarc LH 7-16 electrode deposits over 60% more metal than conventional low hydrogen electrodes, by actual test. The three factors making this welding speed possible are: (1) concentrated arc energy, (2) powdered iron coating melts and becomes part of the weld, and (3) extra-heavy coating helps control arc action and allows higher currents to be used with complete safety. *Air Reduction Sales Co., Div. of Air Reduction Co., Inc.*

For free copy circle No. 14 on postcard, p. 105.

Hi-Power batteries

A bulletin covering C & D's new line of Hi-Power batteries for use in the control, switchgear, emergency lighting and auxiliary power fields also includes data on battery ratings and capacities, details of design and construction, dimensions, weights and types of containers. *C & D Batteries, Inc.*

For free copy circle No. 15 on postcard, p. 105.



Form Tools

Dies from Templates



Facing 90° shoulders



Duplicating a Cam



Interchangeable molds

Automatic duplicating of MANY shapes on a Cincinnati Shaper...

Many diversified parts are accurately reproduced at low costs by automatic duplicating on Cincinnati Shapers.

Single point tools—simple low cost sheet metal templates, or the part itself are used to duplicate the piece.

The Shaper is instantly reconverted to standard use when desired.

Automatic duplicating can save you money and time in your shop.

Write for Bulletin N-6.

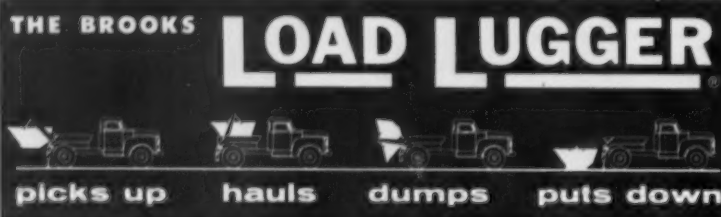
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



One truck does the work of many!



WHAT IT IS

The **BROOKS LOAD LUGGER** is a flat-bed truck body with a pair of hydraulic-powered hoisting arms, which is mounted on any truck chassis of suitable capacity. Standard models lift pay loads of up to 18,000 pounds at a time. Some special-purpose models lift much heavier pay loads.

LOAD LUGGER CONTAINERS are patented, tilt-dumping containers with deep, leak-proof bottoms. Capacities range from 1½ to 14 cubic yards for standard models. Some special-purpose models are much larger. A variety of open and closed containers handle solid materials, powders, sludge, liquids, and gases. Special pallets handle free-standing and unit-packaged materials.

Controlled by the driver from his cab, the truck-mounted Brooks Load Luger lifts a Load Luger Container onto its steel deck, carries it well forward for correct load distribution, cradles it between steel sidewalls for travel safety, hauls it away, dumps or spreads its contents, then returns the container and puts it down.

HOW IT IS USED

The **LOAD LUGGER SYSTEM** of materials handling calls for a number of Load Luger Containers to be placed at points of need. These containers collect material as it accumulates, which reduces handling and eliminates loading crews. Then, loaded containers are picked up, hauled away, dumped, and returned on a regular schedule by a truck-mounted Brooks Load Luger, which replaces many conventional trucks and eliminates loading time formerly required.

WHO USES IT

Industrial operations all over the country (quarries, foundries, steel mills, paper mills, refineries, chemical plants, brick plants, metal fabricators, etc.) use this versatile equipment to handle raw materials, finished products, and waste materials. Contract haulers of wet and dry refuse prefer Load Luger equipment, as do scrap metal dealers, construction contractors, cemetery operators, and sugar cane growers. Government approval is evidenced by the many municipal, state, and federal installations. New uses and new users, such as cable reel handling by power and telephone companies, are constantly coming into the picture.

WHY THEY LIKE IT

The Brooks Load Luger has no cumbersome superstructure or extra operating gadgets because of its patented simplicity, clean design, and sturdy construction. This results in a lower first cost, lower maintenance costs, the ability to carry more pay load on a given truck chassis, and a clear deck for multipurpose use. Its double-acting hydraulic cylinders, four-point container suspension, secure container cradling, and fully controlled tilt dumping are important contributions toward greater operational safety.

Load Luger Containers are job-designed and job-proved. They are low and easy to load to full rated capacity. They dump clean because they are tilt-dumping, and they have no bottom openings to allow messy or unsanitary leakage. Appropriate models are dust-proof, rat-proof, fly-proof, and almost odor-proof.

Rubber goods

A new molded rubber goods and industrial sheet packing catalog is available. The molded rubber goods section contains a specification chart and a check-sheet type of form for readers desiring engineering assistance on special problems. The industrial sheet packing section lists ten types of all-purpose pure gum and synthetic rubber sheet packing and the recommended uses for each. These all-purpose packings permit a gasket-cutter or processor to stock relatively few items to gain coverage for many types of finished products. *Hewitt-Robins, Inc.*

For free copy circle No. 16 on postcard, p. 105.

Strain gages

A 1955 price list for SR-4 strain gages, instruments, accessories, and cements with revised quantity discounts is announced. The 12-page booklet includes specifications for all sizes and types of bonded resistance wire strain gages, and tells how to select the right gage to meet various conditions of use.

Baldwin-Lima-Hamilton Corp.

For free copy circle No. 17 on postcard, p. 105.

Fork truck

A 4-page folder illustrates and describes an 8000 lb capacity electric powered fork truck. It features contactor controls, worm drive, caster trail axle, packaged unit assemblies, rocker arm tilt, low hydraulic pressures and a protective cowl for the operator. It also has front wheel drive, rear wheel steer, and is a tilting, telescoping, center control, sit-down type model. The folder has photos of the truck performing a variety of operations.

The Elwell-Parker Electric Co.

For free copy circle No. 18 on postcard, p. 105.

Revolving cranes

An illustrated folder describes a radically new self-propelled diesel-electric revolving crane. Each new feature is clearly illustrated through use of actual on-the-job photographs and statements of application. One innovation is electrically-powered outriggers which are set and retracted from the cab.

R. G. LeTourneau, Inc.

For free copy circle No. 19 on postcard, p. 105.

BROOKS EQUIPMENT & MFG. CO.

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FREE TECHNICAL LITERATURE

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This section starts on page 100

Overhead cranes

A new 32-page book, designed as a convenient reference manual, describes a wide variety of standard and special overhead cranes. More than 80 photographs show typical crane applications ranging from ¼-ton hand operated units to 350-ton giants, including fully automatic types. Helpful data on planning crane installations and selection of correct types is included. *Moffett Engineering Co.*

For free copy circle No. 20 on postcard, p. 105.

Saws, thread cutters

Descriptive information and technical data on Wagner saws and thread cutting machines are contained in an illustrated catalog. In addition to semi-automatic and fully automatic cold saws for ferrous metals, equipment covered includes mitre saws, cold circular saws for nonferrous metals, saws for steel castings, a combined cold circular saw and multiple drilling machine, saws for small rolled sections, thread cutting machines, and die heads. *Klingelhofer Machine Tool Co.*

For free copy circle No. 21 on postcard, p. 105.

Bearings

The Pollard "Self-lube" sealed bearing design, which offers the maximum duty for a minimum of attention and outlay, is described. The one-piece housing enables the bearing to be fitted as a complete unit, eliminating the hazards of an exposed bearing. The improved sealing devices are of the flexible type, ensuring long trouble free service. Dimensions, load ratings, shaft tolerances and prices are given. *Pollard Bearings, Ltd.*

For free copy circle No. 32 on postcard, p. 105.

Hardened steel ways

The advantages of Coes hardened steel ways, which can be held to any desired hardness, are given in an illustrated folder. The folder also includes applications. One company uses them in their No. 20 cutter and tool grinding machine, while the second uses them in a die casting machine. The third firm uses them in a measuring instrument to maintain the extremely close tolerances required to consistently maintain precision gear inspection. *Coes Knife Co.*

For free copy circle No. 23 on postcard, p. 105.

Lift trucks

Production delays, and other materials handling problems resulting from inefficient warehouse handling, disappeared at a firm when four work lift trucks and a take-it-or-leave-it pallet system was installed. Previously 6 to 8 manhours were needed to load one railcar. It now takes one man and one lift truck just 30 minutes to load 800 bags of cottonoil meal. *Towmotor Corp.*

For free copy circle No. 24 on postcard, p. 105.

Rubber stamps

A complete illustrated catalog, designed to guide you in the selection of rubber stamps and products related to this method of marking, is available. Most of the items pictured can be supplied from stock, and many adaptations of certain models are available. The firm also manufactures industrial marking products, such as marking machines, steel stamps, and stencil machines. *Rubber Stamp Div., Jas. H. Matthews & Co.*

For free copy circle No. 25 on postcard, p. 105.

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Industrial counters

Data sheets on a line of unitized modular industrial counters and controls are now available. Two basic groups of instruments are featured: totalizers or simple counters, and pre-set counting units. The company offers more than 140 combinations of equipment for counting and control application. *Atomic Instrument Co.*

For free copy circle No. 26 on postcard, p. 105.

Sharonart

A new approach to product design, Sharonart (patterns actually rolled into the surface of steel) is described in an interesting booklet. Any repetitive design imaginable can now be duplicated on one or both steel surfaces, permitting product restyling, model changing, etc., at minimum cost. The booklet depicts some of the many ways Sharonart is now being used by manufacturers in the metal products industry, and will give you an idea of how you may design a new product with this metal at substantial savings. *Sharon Steel Co.*

For free copy circle No. 27 on postcard, p. 105.

Rod end bearings

Tables of dimensions and load ratings on the new line of Sref and Screm commercial rod end bearings are given in a 4-page catalog. Patterned after their Monoball bearings, the new line is available in bore sizes from 3/16" to 3/4". *Southwest Products Co.*

For free copy circle No. 29 on postcard, p. 105.

Trunk hardware

A profusely illustrated 40-page catalog covering their complete line of trunk hardware and luggage accessories has just been published by Sessions. They are also well equipped to produce special hardware or stampings, and other special items which may be required. *J. H. Sessions & Son.*

For free copy circle No. 30 on postcard, p. 105.

Repainting transformers

An 8-page illustrated publication on the subject of repainting transformers in the field is available. It includes a discussion of proper painting methods for longer paint life, preparation of paint, number of coats required. Another subject covered is that of repainting substation transformers. *General Electric Co.*

For free copy circle No. 31 on postcard, p. 105.

Investment casting

A bulletin on gas fired furnaces for investment casting has been released. It tells how Surface gas-fired furnaces provide uniform mold heating, accurate time-temperature cycles and simple burner control. The furnace characteristics which serve to minimize distortion or expansion of the mold to assure maximum production of high quality castings are described and illustrated with a diagram of a typical five-zone continuous furnace. *Surface Combustion Corp.*

For free copy circle No. 32 on postcard, p. 105.

Coolant filters

Delpark coolant filters available for the Thompson grinder line are described. Illustrated in this bulletin are four major models of the Thompson line. Listed are grinder models using wet grinding methods and the recommended filter for each. *Industrial Filtration Co.*

For free copy circle No. 33 on postcard, p. 105.

Bench presses

The design and construction features of Series E single acting, open back, power bench presses are presented in this 12-page illustrated booklet. The presses described have rated speeds ranging from 170 to 250 rpm. Many work samples are shown to indicate the application of these presses to closing, riveting, light blanking, stamping and piercing operations. *Waterbury Farrel Foundry & Machine Co.*

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Only Continental Engineers Are Specially Trained for Special Fasteners!

Read why they now lead the industry in special fastener production

Each engineer at Continental is required to undergo thorough experience producing ground thread taps and gages, with their exacting screw dimensions. This special training in the highest standards of precision is passed on to you in every Continental product—at no extra cost.

Continental's superior accuracy and greater thread uniformity has boosted it to the top of the industry in the production of special fasteners—with an average of over 6500 different blueprints turned out each week. Many times, Continental cold forged fasteners have been substituted for expensive screw machine products; improving the

product by increasing its strength while reducing its cost.

Why not put your special fastening needs in the most experienced hands? Call or write today and talk over your problem with the Continental engineers.



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like a precision
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TECHNICAL BRIEFS

FINISHING: Get More Protection

Chemically inert, temperature resistant dispersions give tough, high-gloss coatings... Materials can safely be coated flat before forming... Finish has high abrasion resistance.

Equipment operating under extremely high-temperature and corrosive conditions is most in need of adequate protection to decrease down-time and reduce maintenance costs.

Now, such protection can be obtained with chemically inert, high temperature-resistant materials which may be applied by spraying, dipping or spreading on a variety of metallic as well as non-metallic surfaces. Called Kel-F Dispersions, these new materials are produced by The M. W. Kellogg Co.

Have Long Shelf Life

In appearance, they are characterized by a high gloss. They will neither contaminate the products they contact nor corrode the surfaces they protect. Production-wise, they can often promote economy since their flexibility frequently permits the coating of metals in the flat prior to forming. Shelf life of these coating materials is three years.

Tough, Adherent Coating

The application of these dispersions gives a tough, adherent, continuous coating with all the important properties of the original plastic. It has high resistance to temperatures approaching 400° F and low temperature flexibility; excellent resistance to chemicals, including alkalis, mineral acids, strong oxidizing acids, solvents; low permeability to moisture, organic and inorganic liquids and vapors; high abrasion resistance and tensile strength; low cold flow and high impact resistance; high dielectric strength and electrical resistivity; and non-toxic and non-sticking characteristics.

These dispersions consist of finely divided particles, 1 to 20 microns, of Kel-F plastic suspended in volatile organic liquids, similar to those

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 105. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

employed in normal paint and lacquer systems. The organic media is carefully selected for proper viscosity and volatility characteristics to permit the rapid spray application of non-sagging, non-running, smooth, wet films which fuse to a thickness of 2 to 2.5 mils.

HI NEIGHBOR!

With 5 plants and 20 offices, Milford is "next-door neighbor" to everyone who uses tubular rivets. That means fast deliveries, prompt service and top quality!



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Plants: Milford, Conn.; Norwalk, Calif.; Elyria, Ohio; Aurora, Ill.; Hathers, Pa.

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(Tubular, split and special cold-formed)
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TECHNICAL BRIEFS

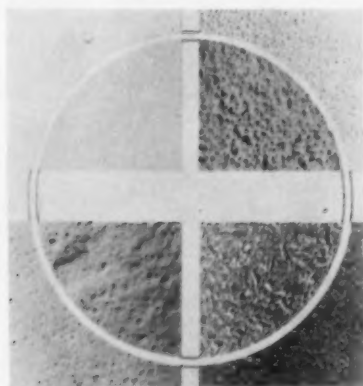
Kel-F dispersions are of two major types, available commercially: NW-25-TR, a low-viscosity dispersion for spraying and N-2, a high viscosity dispersion for spread, flow and dip coatings. Low molecular weight waxes are included in the general purpose spray formulation to contribute to the cohesion and adhesion of the air-dried particles to supporting surfaces. The major portion of the wax volatilizes during baking.

The coating thickness will depend on the application. For corrosion control, a minimum thickness of 10 mils is usually built up in four or five successive coats. For extremely severe corrosion problems, however, coatings are occasionally built up in thicknesses of 15 to 20 mils. For release or anti-sticking applications, a 4 to 6 mil film is usually employed.

Have Wide Range of Uses

Most metals including steel, stainless steel, aluminum, nickel, silver, cadmium, and lead-tin alloy plated copper, can be coated satisfactorily with these dispersions. However, copper itself and non-plated copper-bearing alloys oxidize excessively at high fusion temperatures and form a brittle oxide which is non-adherent to the base metal.

A few current uses of these new dispersions are as coatings for trailer tanks, tankcars, storage tanks, pipe lines, pumps, mixers, valves, flowmeters, reactors, shipping containers, waste neutralizers, agitators, calendaring rolls, forming dies guide rolls.



Finishes compared . . .



1. PRODUCTION PROBLEM:

To increase production and cut unit costs of finishing crimps and grinding flutes of forged steel auger bits, Irwin Auger Bit Co. had been using grinding or hard wheels and set-up wheels in a costly three-step operation which produced only 50,000 units per week—far less than the company's requirements.



2. SOLUTION: A 3M Representative showed this Wilmington, Ohio manufacturer how the 3M Method would grind and finish forging in just one operation using a Grit 60 Electrocut Three-Mite Cloth Belt, and produce a smoother, more even finish than was obtainable with set-up wheels.

3. RESULTS: A 50% production increase. The 3M Method boosted weekly output to over 80,000 units—cut unit costs, too. And man hours for this operation were greatly reduced. A 3M Representative can help you solve your grinding and finishing problems, too. Call him. No cost or obligation.

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Minnesota Mining & Mfg. Co.
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Gears:

Nickel steel pinions set service record.

Over 3½ million tons of steel produced during 37 months of uninterrupted operation—is the record established by three cast nickel alloy steel pinions on the 43-in. blooming mill at United States Steel Corp.'s Ohio Works at Youngstown.

Previous life for pinions in the mill was 5½ months, with an average production of 477,612 tons. The cast steel pinions produced about seven times as much steel and operated about seven times longer, without interruption.

Superior Shock Resistance

Recently the mill was shut down and the pinions, made by Mackintosh-Hemphill, were removed while the housings and bearings were repaired. The pinions still were not worn out.

Combination of a tough wear-resistant alloy with a specially developed and improved heat treatment contributed substantially to the pinions performance, it is reported.

Superior shock resistance is the outstanding single quality of these pinions, which have the following physical properties: Tensile strength 100,000 psi, yield point 70,000 to 80,000 psi; elongation (2 in.) 20-25 pct, reduction of area—45-50 pct, Charpy V-notch impact 17-20 lb hardness 34 Scleroscope.



Pinion sets record . . .

some of the finest products
America uses and enjoys
are made with

LACLEDE STEEL TUBING

LACLEDE STEEL COMPANY
SAINT LOUIS, MISSOURI

... IF IT'S A HIGH PRODUCTION PROBLEM ...

ASK



BAIRD

ABOUT IT



ENGINE PISTONS *travel fast* THRU *automatic* ASSEMBLY of BAIRD 6-SPINDLE CHUCKERS

With push-button operation in many large metal working plants, the Baird Chucker has graduated from a valuable single unit to an invaluable assembly for completely automatic production lines.

Higher, constant speed is one reason . . . minimum manpower . . . and maintenance of close tolerances during continuous removal of metal is, perhaps, the outstanding feature. The photo above shows an assembly of three Baird Chuckers automatically machining engine pistons in a leading automobile plant.

In this instance, operations include finish turning of the engine piston and finishing

the oil ring grooves to size.

This Model 76H Chucker (7" chucks, 6-spindle horizontal machine) combines, in a single indexing cycle, such operations as turning, facing, drilling, tapping, threading, grooving and chamfering, if required.

Electrical and mechanical safety devices prevent damage when any motions are out of time or sequence. All tooling is easily accessible . . . spindle speeds are individual and variable. Design and construction assure long service life. If you require repetitive production of this nature . . . hand load or unload or entirely automatic . . . ask Baird about it.

3BA54

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THE BAIRD MACHINE COMPANY

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WHERE YOU WILL GET THE HELP OF SPECIALISTS
ON THESE ESSENTIAL PRODUCTION PROBLEMS:

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & TUBES METAL
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For the OVER-ALL JOB—With Guaranteed Results in

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Large, Continental Rotary Hearth Billet Heater. Automatic charging and discharging manipulators control delivery of uniformly heated billets to extrusion press.

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for military production . . .

Whatever your heat process problems in plant conversion for military production, CONTINENTAL has the answer.

CONTINENTAL jobs begin with analysis of the requirements, then the selection and development of proper methods for greatest results. Finally follows the design, the building, and installation of the equipment including necessary work-handling accessories and control devices—delivering a COMPLETE UNITIZED PRODUCING PACKAGE with results guaranteed.

The broad experience of CONTINENTAL offers you a prompt, sure solution to your change-over program.

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PLANNED MILITARY PRODUCTION

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FURNACES
PRODUCTION LINES

SPECIAL MACHINES
COMPLETE PLANTS

MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

TECHNICAL BRIEFS

Broaching:

**Fewer machining operations,
improved output obtained.**

Use of two broaches in the machining of an intricate steel grenade launcher at the plant of a Detroit ordnance subcontractor recently helped eliminate 10 milling and a grinding operation.

Ten Operations Required

The new technique in doubling production, not only reduced scrap 70 pct and dropped costs 30 pct, but also eliminated the necessity of tying up nine milling machines required to reproduce the part.

Ordnance specifications on the part called for 10 operations and finish grinding to reproduce the item shown in an accompanying sketch. The work also required surfaces to be finished on AISI-C1141 carbon, steel hardened to 20 to 30 Rc, to within 125 micro-inches.

Previously the work was set up on nine milling machines to mill the required slots, chamfers and provide the necessary finishes.

Broaching Machines Suggested

The biggest problem was size variation. This necessitated frequent mill adjustments and per-piece inspection to keep within government specifications. Production was so slow that another method of fabrication was sought by the subcontractor.

Acar Broach which already had solved knotty problems for the company previously, suggested the use of two broaching machines, estimating possibly a 20 pct reduction in scrap.

Form Broach Used

In undertaking the job, Acar Broach tooled up two machines in its own Detroit plant—a horizontal twin-ram 5-ton, 48-in. stroke pull broach machine, and a vertical 5-ton, 36-in. stroke surface unit. The former was tooled up with a special form broach, the latter with a special finishing broach.

The form broach was designed

time studies prove it!

**95 man-hours saved for every
400 lbs. of lubricant you use!**

Alemite cuts costs!

**all the way from barrel to bearing
...in maintenance...repairs...
down-time...**

YOU SAVE...STEP BY STEP!

With operating costs sky-high, any saving is important. And with this Alemite lubrication system you *start* with a saving of 95 man-hours for every 400-lb. drum of lubricant used. And far more important than this initial saving is the saving in *machine hours*—decreased maintenance costs—increased efficiency and output.

Alemite Barrel Pumps fit directly into either a 400 or 100 pound drum, send lubricant wherever it is needed anywhere in the plant. Or drum and pump can be placed on a wheeled dolly to go right to the machines. You get the big advantage, the protection, of a completely sealed system. Lubricant reaches bearings "refinery clean," with no mess or waste.

Machines get the time-saving protection of power lubrication regardless of whether pump is portable—or stationary for piped systems or overhead reels.



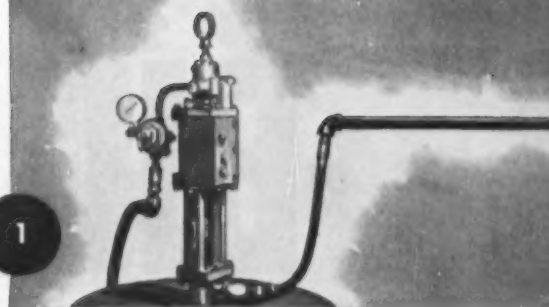
**With Alemite Plan "D"
Lubricant is "Refinery Clean" Wherever Applied!**

These applications of Alemite Barrel Pumps to provide tailored power lubrication are known as Alemite Plan "D". This is one of the five Alemite plans that your trained Alemite representative can show you. Ask him for your free copy of the new Alemite booklet, "5 Plans for Better Plant Lubrication"—or use the coupon at the right. It will show you how to save money in your plant!

ALEMITE

INC. • S. P. O. •

Ask Anyone in Industry



An Alemite Barrel Pump, either air or electric powered, is inserted in a fresh drum of lubricant. Lubricant is still sealed—"refinery fresh."



Now the Barrel Pump supplies lubricant, through pipe, anywhere in the plant. Operator simply carries a hose and control valve to the outlet, hooks it in, applies lubricant.



Where piping of lubricant is not practical, power lubrication can be brought right to the machine by simply mounting drum and pump on a dolly.

FREE!

**New Booklet: "5 Plans
for Better Plant Lubrication"**

Alemite, Dept. N-65, 1850 Diversy Parkway,
Chicago 14, Illinois



Please send me my **FREE** copy of "5 Plans for
Better Lubrication."

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A PRODUCT OF
SW
STEWART
WARNER

You Get **BIG** savings on ...runs of ...parts

...from **Western**



Ultra precision work is usually associated with small parts, but WESTERN is accustomed to .0005" tolerances on big parts, too—up to 4½" round. As a matter of fact, we specialize in long runs of difficult, complicated parts and assemblies, and we deliver them the way you want them, when you want them.

Whether you're interested in big or small parts, plain or fancy, it pays to put WESTERN on your production team. We're equipped to do precision machining plus all finishing operations such as grinding, polishing, magnafluxing, heat-treating and penetrating.

This 4½" round alloy steel part has No. 12 pitch, class 3 fit internal threads, and requires 20 separate operations including penetrating and magnafluxing.

This 3¾" alloy steel part is hardened and ground. Tolerance of o.d. is just .0005".

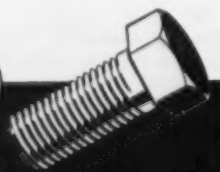
This 4½" round part requires drilling, counterboring and re-cessing.

You save money, time and trouble by getting quotations on precision parts from WESTERN. Write us today.

**Western Automatic
Machine Screw Company**

380 Woodland Ave., Elyria, O.

Precision Screw Products, Parts and Assemblies Since 1873



to cut a slot ¼-in. deep by ½-in. wide, two 45° chamfers, and one 0.003-in. step, all in one pass on one ram. The other ram of the machine was used to perform a straddle broaching operation on the launcher.

Use Two-Position Fixture

The vertical machine was equipped with a two-position fixture. This enabled the right hand ram to perform a slab broaching operation, the same broach finishing a pad to 0.001-in. tolerance and producing an 0.015-in. step. The left hand position finished a tang to 0.093 in. thickness by ½-in. in length, including an ¼-in. radius.

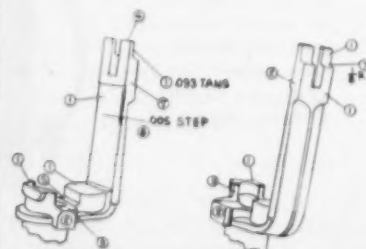
Output Up 50 Pct

In placing the two machines in production, they stepped up output better than 50 pct, producing 160 pieces per hour. Scrap was reduced 50 pct more than estimated, and per-piece costs dropped almost a third.

The savings came not only from combining operations, but also from the special fixture which simplified work positioning, and located the work accurately in relation to the broaches, leaving no room for errors.

Parts Now Spotchecked

Elimination of operator errors transformed inspection procedures from a piece-by-piece necessity to an occasional spot checking.



TWO-SKETCH view of upper portion of grenade launcher. Two broaches did job of 10 milling operations to achieve volume production. Operations: 1, slab or surface; 2, straddle; 3, slot; 4, trim; 5, chamfer; 6, step; 7, radius.

Corrosion:

Non-toxic coating with aluminum pigment developed.

Engineers and maintenance personnel faced with the problem of applying effective corrosion preventatives to dark surfaces which are damp, wet, or sweating may find the answer in a new aluminum damppcoating product developed by Xzit Chemical Co., Hoboken, N. J.

The company has for some 15 years been manufacturing a protective coating called Serviron a black, permanently soft, self-healing, viscous coating material. The non-toxic, odorless Serviron was designed for protection of submerged and exposed steel surfaces which undergo severe corrosion.

It was also used successfully on such surfaces as those on water tank interiors, underground pipe lines, piers, ships' hulls, subways, and deck machinery.

"Holidays" A Problem

During the years the black Serviron was used, however, Xzit had frequent inquiries as to why the coating was manufactured only in the one color.

Engineers often found the black material hard to apply without leaving "holidays" — or surface areas that had been missed. The dark surface made inspections difficult; and painters were anxious to have a lighter, more pleasant color with which to work.

Years of research by Xzit could not uncover the correct pigments which would be non-toxic, and at the same time would allow the damppcoating to be produced with the same basic formula which had proven itself over the years.

Aluminum Pigment Successful

Recently, however, the company tried aluminum pigments—and hit the answer. The characteristics of aluminum pigments — non-toxic, highly reflective, durable, moisture resistant—were ideally suited for their needs.

The product Aluminum Serviron emerged only after months of development and testing work by Xzit Chemical Co. and the research laboratories of Aluminum Co. of

Here's why you should talk to LEVINSON

... about your fabricated steel requirements—



Whether you need fabricated furnace steelwork or a simple beam and column job, you can be sure when your steel is fabricated at Levinson, it will fit together as easy as an erector set.

Levinson will be meticulous about delivering your steel when promised.

Every pound of Levinson's large stock of steel is under roof and Levinson can fabricate almost any job from stock when your requirements are rush.

Levinson's engineering "know how" helps in a hundred ways to make sure you get a perfect job.

Some of the jobs going through our plant in recent months include fabricated steel for—

School buildings • Apartment houses • Office buildings • Sintering plants • Power plants • Coal preparation plants • All types of industrial and commercial buildings • Coke oven steelwork • Industrial furnace steelwork • Conveyor steelwork • Chutes, hoppers, bins, trough sections • Platforms, galleries, soaking pit covers, annealing boxes, turntables for rotary furnaces.

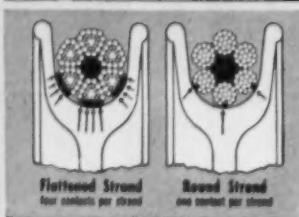


founded 1902

the LEVINSON STEEL

COMPANY

21st & Wharton Sts., Pittsburgh 3, Pa.
Phone HUbbard 1-3200



How to handle the tough jobs with Hercules Flattened Strand wire rope

When you think you need a super-rope, check Hercules Flattened Strand. This is the wire rope that packs in 10% more steel than round strand rope, making it 10% stronger and safer. It wears longer and more evenly—reduces sheave wear, too.

The 10% extra strength over round strand rope is sometimes the difference between the possible and the impossible. Hercules Flattened Strand frequently does the tough jobs which would otherwise require larger size rope—and without the bother and expense of changing sheaves and drums. The extra strength is useful, too, when shock loading is involved. Saves rope—and money.

If you think that Hercules Flattened Strand wire rope may solve a problem, talk it over first with your Leschen man. He can be reached through your nearby Leschen distributor. His advice is based on the best possible authority—Leschen's long experience and engineering research—the longest in the industry. And with Leschen wire rope you are assured of higher-than-rated quality and longer-than-expected service.

If you can use Hercules Flattened Strand rope you'll be money ahead. See about it soon.



Depend on Leschen's higher-than-rated quality for longer-than-expected service.

LESCHEN WIRE ROPE DIVISION

H. K. PORTER COMPANY, INC.

St. Louis 12, Missouri



America, supplier of the pigment.

Non-toxic in all respects, the Aluminum Serviron was ideally suited for coating tanks containing drinking water. With the product's bright color, "holidays" were easily discernible, resulting in a better coating job than had been previously possible. In poorly illuminated areas, such as ships' tanks, aluminum dampcosting made inspection easier.

Workers found it more pleasant to work inside ships' tanks, with a better job resulting. And Xzit has found that since using Aluminum Serviron, thicker coatings can be applied.

The application of Aluminum Serviron is a simple operation. All surfaces should be clean of all oil, grease, loose dirt, and foreign matter.

The dampcosting can then be sprayed or brushed. If sprayed, Serviron should be heated to 180°F for maximum coverage and ideal coating thickness. When heated, Serviron may also be applied with a stiff bristle brush.

After the dampcosting has been applied and any excess wiped off, the tank should be hosed down with fresh water. If possible, the tanks should be filled and overflowed until the water runs clear.



AERODYNAMIC requirements for the high-speed B-57 Martin Tactical Bomber specify that the precision skins must butt with extremely close tolerances. Close tolerances plus high production rates are achieved with a modified rivet shaver which, with a guide block attached, shaves the edges of the skins to the specified tolerances.

PROBLEMS WITH ? FERRO-ALLOYS .



**FERRO-BORON
BORON DEOXIDIZERS
BORIDE DEOXIDIZERS**

**FERRO-MOLYBDENUM
MOLYBDENUM OXIDE
RARE EARTHS**

**FERRO-TUNGSTEN
MOLYBDENUM AND
TUNGSTEN METAL POWDERS**

CHEMICALS OF MOLYBDENUM...TUNGSTEN...BORON

Molybdenum is now available in unrestricted supply to improve strength and machinability. Dependable results are still one of its major attributes.

Tungsten, for hardenability and wearability improvement is now used in surprisingly small additions, with great success.

Boron, as an intensifier of the effects of other alloying materials, may be used in very minute additions, and yet maintain the essential properties of the castings desired. The most economical

and satisfactory form to introduce Boron is recognized to be found in MCA's Ferro-Boron.

Operating the world's largest rare earth deposits, the Molybdenum Corporation of America has recently conducted extensive pioneering research in evaluating the properties, applications and uses of RareMeT Compound.

In nodular iron, small additions of rare earths have helped to produce consistently good ductility by counteracting subversive elements such as lead and titanium.

Write today for further information.

MOLYBDENUM

Grant Building

CORPORATION OF AMERICA

Pittsburgh 19, Pa.

Offices: Pittsburgh, Chicago, Detroit, Los Angeles, New York, San Francisco
Sales Representatives: Edgar L. Fink, Detroit; Brunley-Donaldson Co., Los Angeles, San Francisco
Subsidiary: Cleveland Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.



THE FERRY CAP Countr-Bor SCREW



12-POINT HEAD

A NEW, REVOLUTIONARY DESIGN
FOR SOCKET HEAD SCREW APPLICATIONS

OFFERING THESE NOTEWORTHY ADVANTAGES:

1. Takes standard 12-point socket wrench.
2. External wrenching instead of internal.
3. Stronger—more gripping surface.
4. Permits greater wrenching torque.

Packaged goods being readied
for distributors

In brief—a quality product which will do everything required of socket head screws—and more. For all counterbore applications.

Wherever the Ferry Cap Countr-Bor Screw has been tried, users are enthusiastic—saying that these screws are a service man's dream and the best development in socket screws in recent years. They will help you lick tough assembly problems where socket screws are required.

We shall be glad to send samples, prices and complete information promptly upon request.

Ferry Cap Countr-Bor Screws
PATENT APPLIED FOR
MANUFACTURED SOLELY BY

THE FERRY CAP & SET SCREW COMPANY

2157 Scranton Road • Cleveland 13, Ohio

Research:

Scientists produce pure iron of exceptional strength.

Pure and perfect slivers of iron, having breaking strengths approaching a million pounds per square inch—far greater than any other known metal—have been produced by scientists at the Westinghouse Research Laboratories, Pittsburgh.

Larger Crystals Made

Each sliver or "whisker" is a pure iron crystal, so perfect that no defects can be detected in its structure. The crystals are as much as 2 in. long and 0.001 in. thick. Previous attempts produced crystals which could be observed only with the aid of a microscope.

Theoretically, metals free of impurities and imperfections should exhibit fantastic properties which could make them extremely valuable. For example, pure and perfect iron has an ultimate tensile strength at least 10 times that of ordinary iron which has been hard drawn into wire and at least three times the strength of piano wire.

Enough Produced for Study

Pure and perfect iron has been prepared on a scale large enough to make a realistic study of it and begin to find ways to utilize its unusual properties.

The perfect iron "whiskers" are made by heating highly purified iron chloride, a common salt of iron, in an atmosphere of hydrogen gas inside a special furnace at a temperature of about 1100° F.

Iron Atoms Unattached

Through rigid control of temperature and flow of hydrogen, the chlorine atoms in the iron chloride are allowed to unite chemically with the hydrogen at a certain precise rate. This leaves unattached atoms of iron, which 'migrate' slowly toward each other and deposit one upon another in perfect arrangement. Thus, billions of iron atoms 'grow' without any observable defects into a single perfect crystal of pure iron, exactly square in cross section, and often attaining a length of two inches.



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Bunting
distributor...

... for the finest bearing bronze available from stock

Bunting Bronze Bearings and Bars are made of a special Bronze alloy developed in Bunting metallurgical laboratories through study of innumerable bearing applications and many rigid tests. Known as Bunting No. 72 bearing bronze alloy (SAE 660) this Bronze embodies superlative anti-friction properties together with easy machineability and long life.

HE HAS IT

Your Bunting Distributor carries in stock for your money saving convenience completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. Your Bunting Distributor is an industrial distributor or a specialist in certain industrial items. He has been especially selected for his responsibility and his understanding of bearing requirements. Ask him for the Bunting Catalog or write.



Bunting®

BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS
THE BUNTING BRASS AND BRONZE COMPANY
TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

Machining:

Magnetic chucks handle tough milling job.

Magnetic chucks have been used to advantage in a difficult straddle milling operation required in producing track frames for crawler type tractors built by the Tractor Works of International Harvester Co., Chicago.

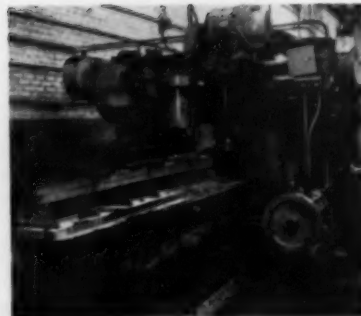
Heavy structural channels are

straddle milled on this job and the heavy cuts remove a considerable length of the flange of two channels at a time.

Setup Is Rapid

Channels are set with backs vertically against the sides of a sturdy Sundstrand Powergrip magnetic chuck fastened to a fixture on the table of the machine.

This chuck makes for quick setup, as it is necessary only to set



Magnetic chuck used . . .

the channels in place, turn on the magnetizing current and tighten nuts on a heavy overhead beam clamp (that is used only for safety purposes) to make the parts ready for milling.

There is ample magnetic clamping to hold the channels securely, despite the heavy cuts, and freedom from vibration is attained.

CAN YOU AFFORD THERMOCOUPLE FAILURE?



PEERLESS *RESTORER*

GIVES YOU PUSH BUTTON REPAIR OF FAULTY THERMOCOUPLE CIRCUITS

Loss of a heat, reheat-treats and costly maintenance often result from errors caused by faulty thermocouple circuits. Even the most modern electronic instruments depend on good circuits to register actual furnace temperatures. The Peerless Restorer operates with your presently installed instruments to detect and correct thermocouple circuit failure instantly DURING ANY HEAT.

SEND FOR CATALOG R-22



STOP — Ruined Heats
— Reheat-treats
— Costly Maintenance

THE PEERLESS ELECTRIC COMPANY • WARREN, OHIO
FANS • BLOWERS • MOTORS • ELECTRONIC EQUIPMENT

Steelmaking:

Method may aid air pollution control.

New progress in controlling gases given off by openhearth steelmaking furnaces was reported by Dr. Leslie Silverman, Associate Professor of Industrial Hygiene Engineering, Harvard School of Public Health, at the recent meeting of the American Iron and Steel Institute in New York.

Dr. Silverman, described developments undertaken at Harvard under the sponsorship of American Iron and Steel Institute.

Studies Are Promising

Experiments on moving filters of slag wool together with rotating screw units have shown great promise in reducing air pollution by openhearth gases. Further study would develop units of practical size and cost, Dr. Silverman believes.

Efficiency and economy are major considerations, since material reclaimed from openhearth furnaces has little if any value, making it difficult for a steel company to receive any direct return on its investment in gas cleaning apparatus.

ALLOY STEELS PAY OFF	
Case	Topic
1	ALLOY STEEL
2	ALLOY STEEL
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60 fully documented
case histories

Facts on
maximum pay load

Facts on
lower operating costs

Facts on
lower corrosion rate

Facts on
toughness, wear, strength

CLIMAX MOLYBDENUM COMPANY, Dept. 2
500 Fifth Avenue, New York 36, N. Y.

Please send me the 208-page handbook
"Alloy Steels Pay Off"

Name _____

Company _____

Title _____

Address _____

**MAIL
THIS TODAY**

If you use steels, here's the handbook you should have



This fact-packed handbook is a must for you if you use steel. Here, in completely documented form, you'll find how the use of alloy steels adds economies, increases service life, offers many other advantages.* Cost-conscious executives will find the full story on these economies of alloy steel in the first section of the handbook. Designers and metallurgists will find the advantages of alloy steels in the 60 case histories. Get your copy today. Climax Molybdenum Company, 500 Fifth Avenue, New York 36, N. Y.

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MSS-18

* Advantages of ALLOY STEELS

- longer life
- greater pay load
- lower operating costs
- greater safety
- less maintenance

CLIMAX MOLYBDENUM

June 16, 1955

121

Soldering:

Automated solder lines cut TV production costs.

Printed circuits assembled by automation have eliminated 425 hand soldered connections from Admiral Corp.'s new television receivers. After assembly each of three printed circuit panels in the company's 1956 TV receivers is

dipped in solder once to accomplish what formerly required several hundred individual solders with hand irons.

In addition to saving time and production costs, the dip soldering method assures higher quality by reducing the chance for possible human error by over 99 pct, it is reported.

Printed Circuits Used

The printed wiring in the new

TV models represents from 75 to 80 pct of all the circuitry. A total of 231 electrical components are mounted on the 13 tube printed circuit sections. Over 75 pct of these components, including resistors, condensers, wire jumpers and tube sockets, are inserted by automation on Admiral-designed automatic assembly machines.

By the end of 1955 practically every major manufacturer will be using printed circuits in its television receivers, Admiral officials believe.

See Higher TV Sales

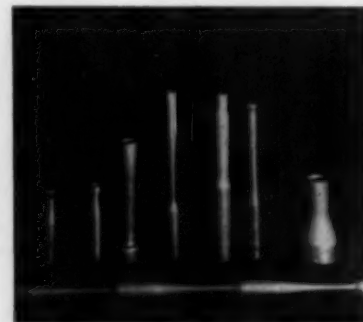
On the basis of present production schedules, June sales should show a 100 pct increase over a year ago, the company believes. Television shipments during the first half of this year will be 30 pct ahead of 1954. Second half unit shipments are expected to register a sharper increase over the same period last year and the dollar gain will be even greater.

Forming:

New spinning process cuts tube forming costs.

Metal tubing is now being formed in an almost endless variety of shapes by a new high-speed spinning process which handles various alloys of aluminum, brass, copper and steel.

This process, in use at Hubbard Aluminum Products Co., Pittsburgh, can produce a multitude of shapes which are concentric about the axis of the tube. After the tube has been spun into its basic shape, it can be formed or bent into the required design. Shapes hav-



Formed metal tubing . . .



"Differential is my kind of car"

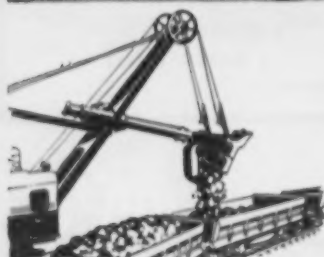
"I like the way they stand up under the punishment of that bruiser of a shovel. Unusually rugged construction does it. Somehow they seldom turn up for roll call at the shop. And out at the stockpile or dump they come clean. That 50° dumping angle is the answer. Dumping to either side is important, too."

This kind of talk from an increasing number of users is convincing. For nearly 40 years Differential Haulage Equipment has been doing a pace-setting job.

DIFFERENTIAL PRODUCTS INCLUDE:

Air Dump Cars, Charging Box Cars, Ingot Mold Cars, Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

If you would like facts and figures to meet your needs, just write or call our Findlay office. You'll get prompt, expert help with your haulage problems, large or small.



SINCE 1915—PIONEERS
IN HAULAGE EQUIPMENT

DO YOU NEED **ADDED** MANUFACTURING FACILITIES or ENGINEERING ASSISTANCE:

For instance:

- New Product design or research
- Help in developing your processing
- Design and fabrication of your tooling and gaging
- A source for components you would rather not make
- An organization to assume full manufacturing responsibility

For many years the Sheffield Corporation in rendering these services to manufacturers, has been able to save them thousands of dollars. Why? Because these services require specialists and specialized equipment which many manufacturers would not be economically justified in adding to their own organizations.

When you turn such a problem over to Sheffield you concentrate all the responsibility under one contract. There is no opportunity for buck passing. You get a specified result at a specified delivery date.

Sheffield has engineering offices in Dayton and many other cities. The main plant in Dayton is fully equipped for manufacturing and especially organized for the fabrication and tryout of dies of all sizes.

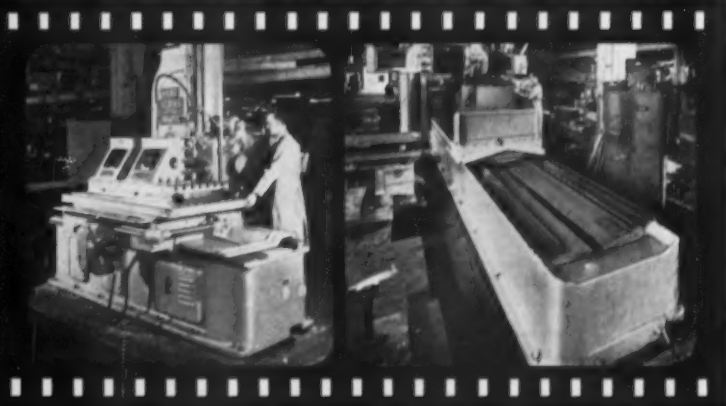
As a leader in the field of Precision Measurement, Sheffield offers the maximum in Quality Control.

Before you need services such as these, have a Sheffield engineer show you in your office, the recent sound slide film which illustrates the operation of Sheffield's Contract Service Division.

Write to Contract Service Division—**Sheffield Corporation, Dayton 1, Ohio, U. S. A.**

See us at the Machine Tool Show—Booth 1305

7154



SHEFFIELD

MANUFACTURE AND MEASUREMENT FOR MANKIND

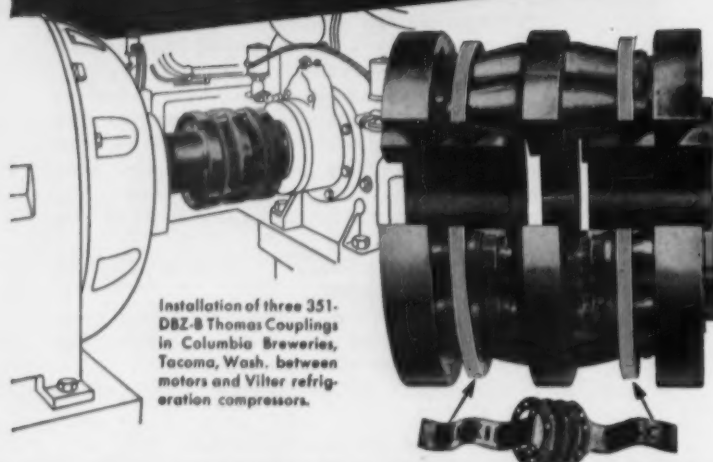
ing a maximum diameter of 10 in. and a minimum diameter of $\frac{1}{2}$ in. can be handled on the equipment. The largest machine will accommodate lengths up to 40 ft.

Substantial production economies have already been effected on small items where multiple spinning is possible. Typical of this economy is the use of configured tubing for tapered conveyor rollers. By producing tapered rollers in a multiple spinning operation two press operations, a welding op-

eration and special finishing have been eliminated.

The process was first used in making tapered aluminum street lighting poles. Although work on the new process is still in the development stage, configured tubing is the answer to forming problems and production economy on hundreds of light metal items. Among those already produced are: ski poles, shuffleboard poles, furniture legs, hose nozzles, pedestals, aircraft parts and lamp columns.

THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Installation of three 351-DBZ-8 Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

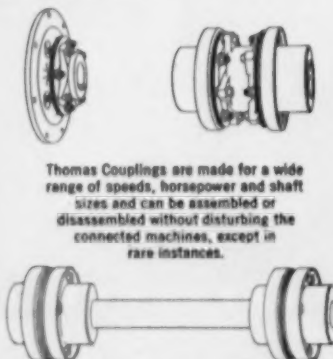
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action for Cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Plastics:

Polyethylene liner for steel container developed.

A heavy-gage plastic liner for steel containers, making it possible to transport chemicals and other liquids at reduced costs, has been developed by Jones & Laughlin Steel Corp.

Called JaLiner, it is the first closed-top plastic liner for steel containers to have the liner as an integral part of the container. It also is the first liner of its type to be installed during container production.

Polyethylene Tubing Used

The liner is available for 5-gal shipping pails, either open with a 16-lug cover or with a close-top. Pouring fittings of either tin plate or polyethylene are also available. The JaLiner is constructed of heavy-gage polyethylene tubing and sheet, heavier than ever before presented in an electronically-sealed contour liner.

It has undergone intensive testing and has proved successful in field trials conducted for soft drink concentrates, photographic chemicals, pharmaceutical, and germicides. It has also successfully undergone vibration — platform and drop-tests—both more exhaustive than regulations require and rougher than conditions of actual use.



New plastic liner . . .

information memo

from the engineering laboratories of CONSOLIDATED VACUUM CORPORATION

Volume 1

CVC

Number 3

MATERIALS HANDLING IN VACUUM METALLURGY

Remote controls

move materials in a semi-continuous, high-vacuum melting and casting furnace.

Like his associates who work open-air furnaces, the high-vacuum metallurgist introduces his charge to the crucible, controls it during melt, samples it, adds alloying materials, and pours ingots.

Unlike his open-air associates, he must do all this from outside a closed chamber, without breaking vacuum.

Bulk charging

How to cope with the packing factor.

Entry to the crucible is made through a charging interlock. The operator loads the interlock with a self-contained windlass. Coils within the interlock preheat the charge, speeding up the production cycle and reducing thermal shock to the crucible.

One packing technique is to incase the charge in a can made of the same charging material. The can initially extends above the crucible. As it melts, the can settles slowly into the crucible producing a full capacity charge.

The alternative method is to make a second bulk charge to supplement the volume lost in melting the initial charge.

Inspection, sampling, alloy additions

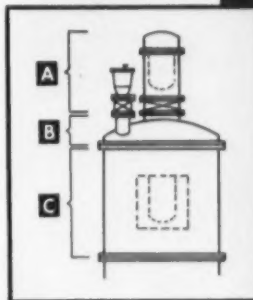
How to control the melt and its composition.

A thermocouple on the furnace cover permits the operator to determine the melt temperature at all times. The cover also contains a bridge breaker and inspection devices. A manual sampler quickly provides specimens of the melt. All these devices focus around the operator.

Since it is usually desirable to hold alloying materials until the bulk charge is melted, there is a second interlock for alloy additions. The operator introduces these materials in precise amounts at exactly the right moment to produce the desired composition.

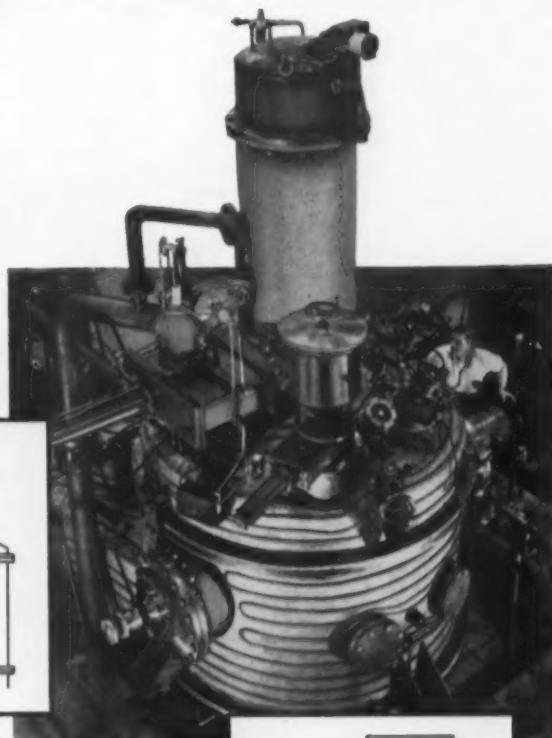
The alloying mechanism normally consists of a number of cans with drop-out bottoms. Each one moves into position on an indexed platform for direct down-the-

The furnace discussed in text being ready for delivery. This is a true semi-continuous, high-vacuum melting and casting furnace with a 1000 pound capacity. It is now installed at the customer's plant.



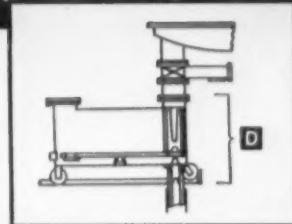
Schematic drawings of the semi-continuous, high-vacuum furnace.

- A Interlocks through which bulk charge and alloy materials are introduced without breaking vacuum.
- B Cover with temperature measurement and inspection devices.



C Chamber containing trunion-supported coil-crucible.

- D Mold chamber and vacuum interlock. Ram lifts mold to short-path pouring position under crucible lip, then lowers it to indexed table where it moves to hot-topping position.



chute discharge into the crucible.

A Syntrol vibrator attachment is also available. This adds the alloy materials into the melt gradually through a vibrating hopper.

Mold pouring

How to achieve a short pour distance.

When pouring multiple molds, a pneumatic ram lifts the individual mold from a rotating table to a position directly under the crucible lip. In this way, the pour distance from the crucible to the mold bottom is at a minimum and better ingot quality results. The absence of spouts and funnels with this technique is an advantage from the standpoint of ingot purity.

Ingot handling

How to avoid piping.

The ram lowers the filled mold to the rotating table. The table moves the mold to a hot-topping position which holds piping at a minimum. At the same time an empty mold is positioned for ram-lifting.

Automatic controls are the rule. The furnace operator guides all his materials by push buttons or turn wheels.

If you are considering a high-vacuum furnace for your plant, allow us the opportunity of discussing the subject with you. Please contact **Consolidated Vacuum Corporation, Rochester 3, N. Y.** (a subsidiary of Consolidated Engineering Corporation, Pasadena, California). Reprints of this and others in the *information memo* series are available on request.

Consolidated Vacuum Corporation, ROCHESTER 3, N. Y.

CVC sales now handled through Consolidated Engineering Corporation with offices located in: Albuquerque • Atlanta • Boston • Buffalo • Chicago • Dallas • Detroit • New York • Palo Alto • Pasadena • Philadelphia • Seattle • Washington, D. C.

Assembly:

Freezing simplifies difficult assembly task.

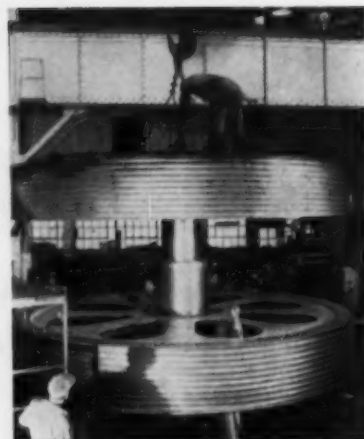
A 15,000 lb trunnion was assembled as the hub of two huge counter-weight sheaves by shrink fitting recently at the Ambridge, Pa., plant of U. S. Steel's American Bridge Div. Immersion in a frigid bath of dry ice and alcohol caused the huge shaft to contract just enough to permit it to enter the

center hole of the 20-ton sheaves.

The deep freeze lasted 5 hours. Workmen then measured the giant steel pin with micrometer to assure the hair breadth clearance needed for lowering the trunnion into the center hole of the first sheave. Seconds later they guided the second 20-ton sheave over the top of the trunnion.

Designed for Bridge

Four of these sheaves are being fabricated by American Bridge for



Twenty ton sheave . . .

the New York Central span. Mounted aloft in 162-ft towers they will raise and lower the 265-ft span for uninterrupted flow of river traffic.

Fabrication of the double track lift bridge which will carry trains over the Cuyahoga River is well under way at the Ambridge, Pa., plant. American Bridge erection crews expect to begin erecting the 3000-ton structure in August and complete it the first part of next year.

Refractories:

Improved synthetic mullite has longer life.

An improved synthetic mullite refractory for high-temperature applications in nonferrous foundries, primary steel production, ceramic kilns and furniture, and power plants has been developed by Richard C. Remmey Son Co. of Philadelphia.

Preliminary field installations of this new refractory show improvements in operating life as high as 250 pct in comparison with competing brands of mullite, the company reports.

Several grades of the refractory are available in the form of bricks, special shapes and ramming mixes. New processing techniques give: Stable refractory qualities up to and including 3326° F; high resistance to thermal and structural spalling; high resistance to deformation at high temperatures.



*your new opportunity in
controlled precision finishing*



Roto-Finish processes a/c controlled precision finishing operations using low cost mass production techniques, which maintain exact tolerances on most any size or shape precision part with no significant dimensional changes. Roto-Finish speeds production, cuts maintenance expense, minimizes operational costs, yet produces top quality finishing results. Roto-Finish offers latest in controlled methods, materials and special purpose fixture equipment. Roto-Finish is your new opportunity in controlled precision finishing with guaranteed results!

Write for catalog today! Ask about free Lab Testing Plan.

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No. 394 at Industrial Finishing Exposition,
June 20 - 23 at Cleveland Public Auditorium

ease your
hydraulic equipment
maintenance problems
with

GULF HARMONY OIL



Use a hydraulic oil that has excellent resistance to oxidation, high film strength, outstanding rust preventive and anti-foam properties—qualities which hydraulic engineers consider to be the most important when selecting a hydraulic lubricant—and you will have fewer maintenance problems and less down time.

Gulf Harmony Oil has all of these qualities. It prevents the formation of sludge deposits and maintains its original viscosity over long periods of time. It also protects hydraulic equipment

against excessive wear, even under severe conditions of pressure, speed, and temperature. And it protects against the damaging effects of harmful rust.

So if you have maintenance problems with your hydraulic equipment, call in a Gulf Sales Engineer. He will recommend the right grade of trouble-preventing Gulf Harmony Oil for your equipment. Contact him today at your nearest Gulf office.

GULF OIL CORPORATION
1822 Gulf Building



GULF REFINING COMPANY
Pittsburgh 30, Pa.

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

June 16, 1955

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Why Granite City Steel is growing 3 times faster than the industry!



Close to customers . . . by truck, rail, barge

From its modern mill near St. Louis, Granite City Steel moves sheet steel to customers by truck, by rail, by barge. This 3-way choice of carriers guarantees prompter, faster delivery to steel buyers in Middle America.

Granite City Steel is located at the gateway to the West and Southwest, at the center of a network of highway, rail and waterway routes that also provide fast shipping lanes to the North and South. The *only* mill in this area offering you 77 years of specialization in quality flat-rolled steel and "next door neighbor" shipping speed, Granite City Steel is your *logical* source of sheet steel in Middle America. Sales offices in St. Louis, Kansas City, Minneapolis, Memphis, Dallas, Houston, Tulsa.



NEW EQUIPMENT

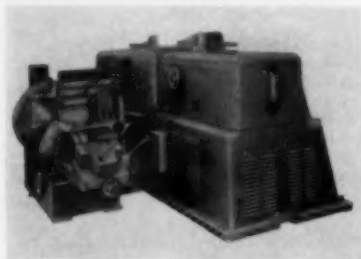
New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 105 or 106

Machinability computer solves machining problems

In less than 2 min and with consistent and reasonable accuracy an electronic machinability computer is said to solve machining problems for the tool engineer. The new engineering tool will enable a methods and service man to determine quickly whether or not he is using a correct set of conditions for machining a job; help him arrive at a proper set of conditions for setting up a new machining operation, or

indicate to him the relative advantages of changing some of the present job conditions to obtain greater production. The self-powered analog unit will consider 14 operational variables in machining, such as grade of carbide, speed, feed, etc. It can be fed information on any of 13 variables and come up with the 14th, or the answer. *Carboloy Dept., General Electric Co.*

For more data circle No. 34 on postcard, p. 105.



Grinder offers accuracy, high production

New double horizontal spindle grinder is equipped with Besly's sealed spindle quill construction. Heads are completely sealed, eliminating wear and its resulting inaccuracy. This construction also permits smooth, accurate adjustment of the abrasive disks and avoids transmitting motor vibration to the

grinding spindle. Controls, motors, starters and hydraulic units are enclosed within the rugged machine base. Controls are automatic and are accessible from either side of the grinder. Individual dressers for each disk are pushbutton operated. *Besly-Welles Corp.*

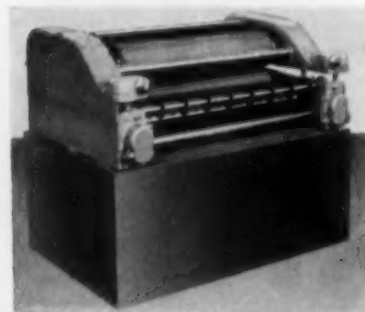
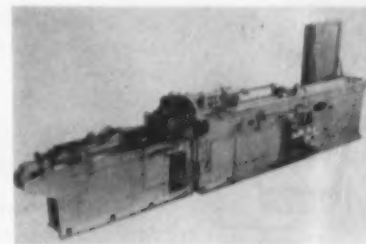
For more data circle No. 35 on postcard, p. 105.

Broaches the ID of laminated rotors

Designed to fit in a conveyor line this automatic horizontal broaching machine with electrical controls automatically positions, clamps, broaches, and ejects the rotors one at a time. A sliding fixture with automatic split V's is used to position and clamp the

part. These retract individually to accept parts from the conveyor line and eject them after broaching. An adjustable chute accommodates several different rotors, feeds parts to fixture. Operations are automatic. *American Broach & Machine Co.*

For more data circle No. 36 on postcard, p. 105.



Roller coater for use on sheet metal

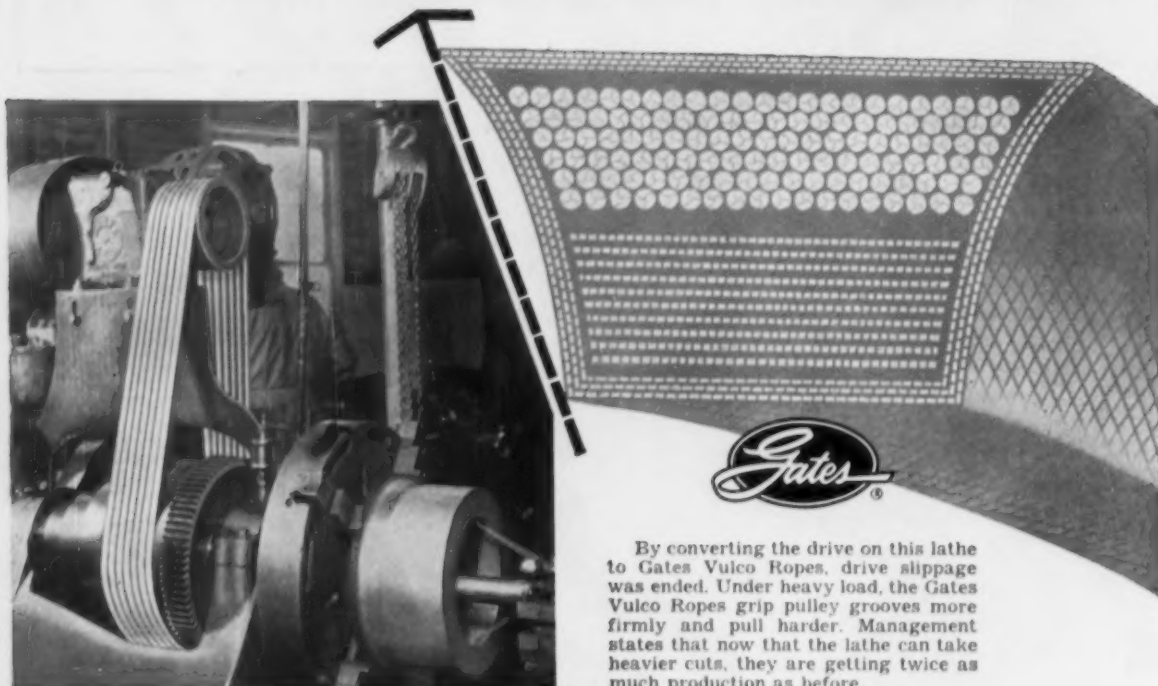
Both sides of metal sheet are coated using a new roller coater unit. Minute adjustments to the correct gage thickness and coating thickness are easily made with vernier controls. The coater features visual gages for the correct micromatic aligning and coating thickness. Mechanical drives permit time-saver roller removal for cleaning without removing, restringing, or

resetting the drives. Upper and lower roll assemblies are completely independent. Jamming due to work overlap is eliminated by hinged construction of the roller assemblies. Provisions are made for heating the rolls and the unit comes complete with swivel connections. *Murray-Way Corp.*

For more data circle No. 37 on postcard, p. 105.

Turn Page

"Secret" of lower belt costs is concave sides



By converting the drive on this lathe to Gates Vulco Ropes, drive slippage was ended. Under heavy load, the Gates Vulco Ropes grip pulley grooves more firmly and pull harder. Management states that now that the lathe can take heavier cuts, they are getting twice as much production as before.



Fig. 1

Plants that keep track of costs on drives know this: they get longer wear at lower cost per year of service when they specify Gates Vulco Ropes—the V-Belts with concave sides.



Fig. 1-A

Here's WHY concave sides keep belt costs down:

When the Gates belt is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley.

This full, uniform contact assures even distribution of wear. Naturally, even wear means longer wear. And longer wear cuts belt replace-

ment costs...reduces down time...contributes to profits.



Fig. 2

Prove to yourself the value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. You see immediately that the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact causes faster wear...increases belt replacement costs.

Reduce costs and down time for belt replacements—specify Gates Vulco Rope Drives—the V-Belt with *concave sides* (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—World's Largest Maker of V-Belts.

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 46-A

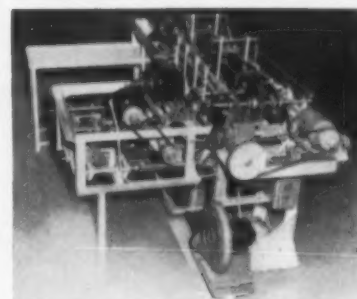
GATES DRIVES

Machine automatically tins gas meter covers

In 1 hr, 150 to 300 gas meter covers can be automatically fluxed and tinned on this new machine. Tinning of meter covers is a prime requisite to final assembly of the meter shell, which is closed by placing the top, bottom and front covers in position and soldering the sides to them. Tinning the cover edges speeds up this sealing opera-

tion. Only one operator is required, his two functions being to load and unload the meter covers. Cycle of operations — preheating, fluxing, and tinning—is completely automatic. Result is a thorough tinning of the meter edges and a smooth front free of rough solder. *R. G. White Mfg. Corp.*

For more data circle No. 38 on postcard, p. 105.



Four-high mill rolls close-tolerance thin strip

Both ferrous and nonferrous strip up to 8 in. wide can be handled on a new backup-driven 4-high rolling mill, at speeds up to 500 fpm. The mill will roll down to less than 0.001 in. finishing gage, holding a total thickness tolerance of 5 pct. The package unit shown is the 2¼ in. and 8 in. x 10 in. model, which has 8 in. diam x 10 in. face width

backup rolls and uses work rolls within a 2½ to ¾ in. diam range. Major feature of the mill is the backup drive method said to facilitate rapid work roll changing—20 min for a complete change. Different diameter work rolls are used to suit desired finishing thickness. *Stanat Mfg. Co., Inc.*

For more data circle No. 39 on postcard, p. 105.

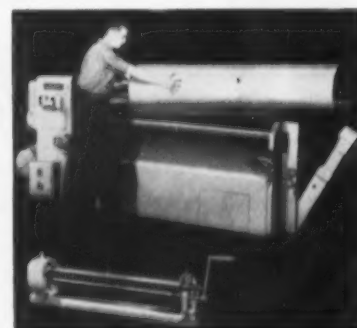


Slip roll formers feature pinch type rolls

Available in a wide range of power and hand operated models, a new line of slip roll forming machines features pinch type rolls to assure production of commercially true cylinders virtually free from flat spots. Two of the rolls feed the material. The third, in the rear, deflects the sheet to produce the curvature. The upper feed roll, around which the sheet is formed,

swings open at one end, clear of its bearing, to permit completed cylinders to be removed quickly and easily. Working with lengths up to 120 in. and thicknesses up to ¼ in. mild steel, the slip roll formers are used in diverse applications to form pipe; stacks, drums, other container bodies; cylindrical products. *Niagara Machine & Tool Works.*

For more data circle No. 40 on postcard, p. 105.

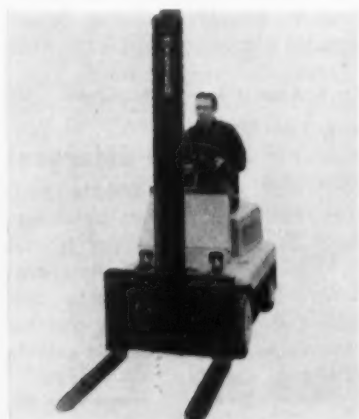


Lift truck features panoramic visibility

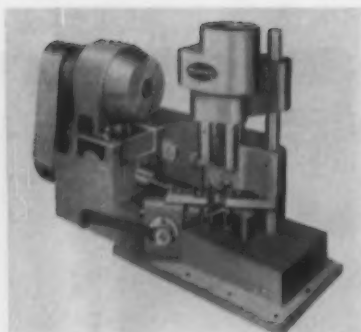
New concept in lift truck engineering is the Hyster Monomast with design consisting of one mast which creates panoramic visibility. Monomast engineering consists of two box-type sections, one telescoping within the other. Operator's clear, unobstructed view to both forks and load permits faster operating speed and reduces driver fatigue. Additional operating advantages are faster maneuverability, faster approach, more accurate load placing and safer load handling. Total weight of the Mono-

mast upright is about the same as standard type assemblies, but tubular design is said to be even stronger than comparable models. Torsional rigidity in the mast has been increased 80 pct and mast deflection reduced 50 pct. Hoist speed is increased 15 pct. Load raising speed is .58 fpm; load lowering speed correspondingly increased. All standard hydraulic attachments can be mounted on the Monomast attachment carriage. *Hyster Co.*

For more data circle No. 41 on postcard, p. 105.



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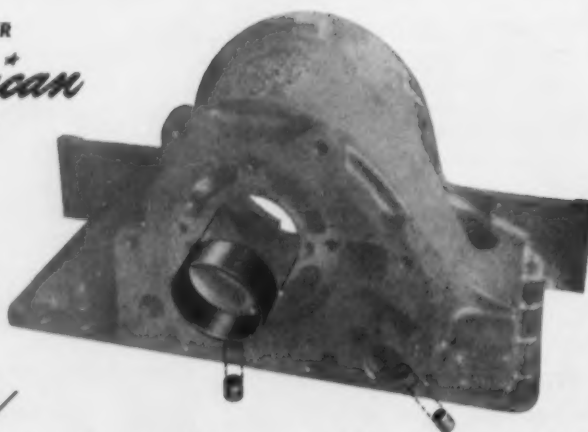
Two-way drilling unit fits standard drill press

Compact, economical unit that permits right-angle drilling on any standard drill press utilizes only one feed source on the press, to operate. Units can be attached or removed easily, permitting quick change in tooling. Operation is simple and accurate. Pressure from the vertical unit, while drilling, advances the horizontal unit. Feeding of the cross or right-angle

is accomplished by rack and pinion gears. All moving parts are lubricated, automatically, by means of a built-in reservoir. Unit shown drills 4 holes in a gear shift lever. Only 3 spindles actually drill these 4 holes: 2 vertical holes and 1 right-angle hole through the split clamping arm. *Michigan Drill Head Co.*

For more data circle No. 42 on postcard, p. 105.

ANOTHER
American
FIRST



**3 parts assembled from 3 different angles
IN ONE AUTOMATIC MACHINE OPERATION**



Parts magazines (indicated by arrows) are loaded with bushing and plug parts. Push button starts machine cycle, case is automatically clamped, and bushing and two plugs are pressed into case simultaneously by hydraulic cylinders.

Designed for an automotive conveyor-type assembly line, this American Hydraulic Press inserts a bushing and two dowel plugs in an automotive transmission case — all three parts from different angles — in a single, push-button controlled, automatic cycle. It is a typical result of the service that American offers for designing and building automatic assembling and broaching equipment.

American's experience in developing machines for special purpose production operations can be of real value to your planning. Engineering versatility is a proven American asset.

A letter or phone call outlining your requirements will be welcomed — and will produce prompt cooperation.

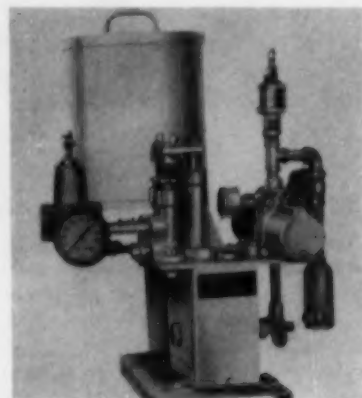
American BROACH & MACHINE CO.
A DIVISION OF SUNDRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

See *American First* — for the Best in Broaching Tools, Broaching Machines, Special Machinery



Automatic lubricator

Life of abrasive grinding belts is said to be increased from 2 to 3 times with a new compact, automatic lubricator. The standard unit consists of an adjustable stroke pump driven by a reciprocating air motor and incorporating



a spray control cylinder that triggers the air only when the fluid is being delivered to the spray nozzle. Controls accurately regulate the frequency of application, the amount of lubricant pumped per stroke, and the air pressure at the nozzle. Standard unit is recommended for belts up to 8 in. wide. *Manzel.*

For more data circle No. 43 on postcard, p. 105.

Alkaline detergent

Removing paint, phosphate coatings, rust, and oil from metal surfaces by using Rustripper is said to eliminate as many as six operations. Rustripper converts metallic salts and oxides into complex substances that are readily soluble in water. *Oakite Products, Inc.*

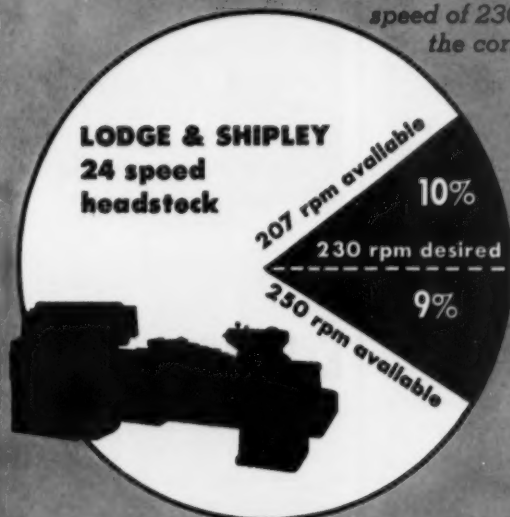
For more data circle No. 44 on postcard, p. 105.

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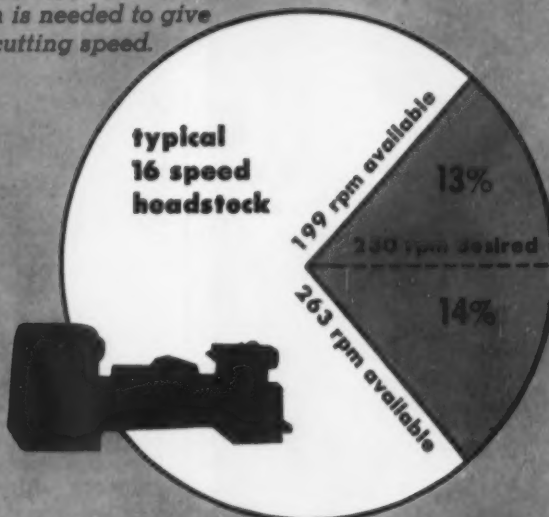
GET MORE PRECISE SELECTION of RIGHT CUTTING SPEEDS

with **LODGE & SHIPLEY 24 SPEED HEADSTOCKS**
due to smaller speed increments over a wider range.

To illustrate our point, suppose a spindle speed of 230 rpm is needed to give the correct cutting speed.



On the Lodge & Shipley 16-inch, 24-speed Headstock, 207 and 250 rpm are available. Choosing 250 rpm gives a speed that's within 9% of the desired speed.



On a typical 16-inch, 16-speed Headstock, 199 and 263 rpm are available. Choosing 199 rpm gives a speed that's within 13% of the desired speed.

On these same lathes The Lodge & Shipley 24-speed Headstock also has a wider range—14 to 1160 rpm . . . compared to the typical 16-speed headstock's 16 to 697 rpm range.

Considering a new lathe? You'll find it well worth investigating the number of spindle speeds, the size of the speed increments and the range. The more speeds you have (up to a practical limit) and the smaller the increments between speeds . . . the more perfect choice of cutting speeds you can make. Insufficient spindle speeds severely limit your selection as indicated in the data above.

Lodge & Shipley Model X Lathes give you 24 speeds . . . up to 50% more than some comparable lathes. That's a 50% better chance to select the correct speed and obtain truly economical production.

Call a Lodge & Shipley representative or write for literature on this subject. The Lodge & Shipley Co., 3055 Colerain Ave., Cincinnati 25, Ohio.

Lodge & Shipleyyour LODGE-ical choice!

Always fasten
aluminum
with
ALCOA
Aluminum
Fasteners



available at your local ALCOA
distributor—fill out coupon
for complete application
and specification
data...

ALUMINUM COMPANY
OF AMERICA
2243-F Alcoa Building,
Pittsburgh 19, Pa.

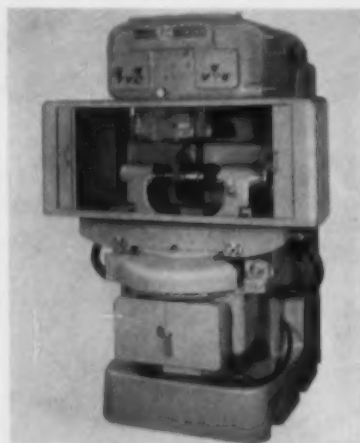
Gentlemen:
Please send complete specification data
and samples of your aluminum fasteners.

Name _____
Title _____
Company _____
Address _____

NEW EQUIPMENT

Either of 2 processes

External spur and helical gears up to 18 in. diam can be finished on a new Red Ring rotary gear shaving machine by either diagonal or conventional shaving processes. The shaver is available in 3 different types: (1) shaves gears by the high production diagonal process; (2) shaves gears by either the diagonal or conventional process and



has an automatic differential up-feed mechanism and (3) shaves gears by either conventional or diagonal processes, has an automatic differential upfeed mechanism, and permits crown shaving operations to be performed. Model GCU-18-in. machine will shave spur and helical gears from 2¼ to 18 in. pitch diameter having 4 to 16 diametral pitch teeth. Table has a maximum stroke of 5 in. *National Broach & Machine Co.*

For more data circle No. 45 on postcard, p. 105.

Automatic demineralizer

New demineralizer features efficiencies of mixed bed ion exchange together with completely automatic operation of all functions, including the regeneration cycle. The equipment is a Mono-Column demineralizer designed for users of 200 gph of super high purity water. The compact, completely packaged unit requires minimum floor space, connection of influent to a plant's water system, and connection of effluent to those points where high purity water is required. Minimum supervision is required. *Penfield Mfg. Co.*

For more data circle No. 46 on postcard, p. 105.



"I Save \$3.54 EVERY TIME WE FIND A CRACKED PART"

"Sounds odd—but here are the facts. The finished cost of this pressure switch housing is \$4.33. Of this, machining and finishing represent \$3.54. This is the amount we save every time a crack or porosity is found in the 'raw' casting. Total net savings were \$1,217 on every thousand parts run!"

Moreover, by adding inspection with Zyglon* (by Magnaflux) at this plant in the rough casting stage, foundry procedures were corrected, so that now only one quarter as many problem castings are produced, as compared to the number when only final inspection was used. With no time wasted on defective housings, production capacity for good parts is naturally increased.

Inspection by Magnaflux' methods during manufacture finds all problem cracks, from any cause, when they first occur. It is cheap, nondestructive and fast! Ask to have one of our engineers give you more facts and savings figures—or write for new booklet on LOWER MANUFACTURING COSTS.

*Zyglon—registered trademark of Magnaflux Corporation



**MAGNAFLUX
CORPORATION**

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Cleveland 15 • Detroit 11
Dallas 19 • Los Angeles 58

MAGNAFLUX

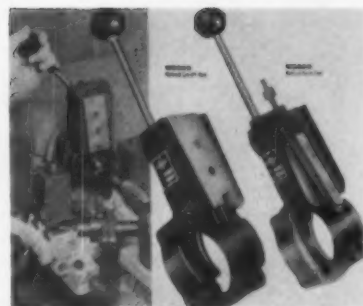
THE IRON AGE

Vertical lathe tools speed production

Vertical lathe tools for cutoff and form work are manufactured in two models for rapid production work where speed and precision are equally important. The vertical cutoff tool features an automatic-return type slide which holds a standard cutoff blade. The vertical form tool also incorporates an automatic-return type slide which holds

a standard $\frac{1}{2}$ in. tool bit. Adjustable stops are provided. Both tools mount on headstock of lathe for maximum rigidity. Advantage of the tools is the third position they provide for turret lathes, which often eliminates the usual second operation. Both tools feature adjustable gib. *Wesco Machine Corp.*

For more data circle No. 47 on postcard, p. 105.



Needs no contour charts

New contour projector designed in Sweden for laboratory work completely eliminates the need for special contour charts. Sharp, distortion-free images are projected directly to a large $\frac{1}{2}$ in. thick heat resistant glass screen for observations, inspections and measurements. Enlarged drawings can be



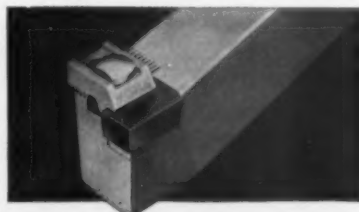
made by the draftsman working directly on the glass screen without having to compensate for distortion. Direct readings are taken with an enlarged drawing, glass scale or table micrometer. Accuracy at 100X is said to be 0.00004 to 0.0001 in. Accessories available extend the usefulness of the projector. *Nife Inc.*

For more data circle No. 48 on postcard, p. 105.

Speed reduction units

New 100 Series reducers are made in a full range of models and ratings for virtually all drive needs. Compact design and improved worm gearing provide greater load carrying capacity with less weight

Turn Page



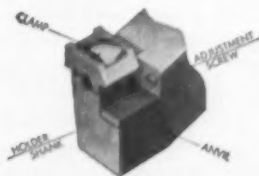
Chip-Hog Heavy-Duty Turning Tools

This line of standard tools recently announced by the Gairing Tool Company is proving this company's claim for "maximum feeds and speeds on any machine." So rigidly constructed as to allow the use of harder carbide grades for given shank sizes, their performance is often limited only by the available machine horsepower.



Case Data Show High Feeds and Speeds

Illustration shows CHIP-HOG at work taking a 1° to $1\frac{1}{4}^{\circ}$ roughing cut around an armor-cast gun turret. With a feed of $\frac{1}{16}^{\circ}$, a surface speed of 150-175 per minute was maintained. Your Gairing representative has many more convincing data to show you, mostly on machining hard and tough materials.



Rugged Parts, Quick-Changed Inserts

With carbide insert removed, holder



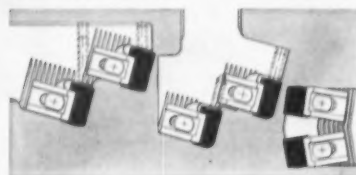
COUNTERBORERS - T-CORO MILLS - BORING BLOCKS & BARS - FINE TOOTH CUTTERS - SPINDLE DRILLS - SPECIAL TOOLS - CHIP-HOG TURNING TOOLS

shows heavy, high-alloy, heat-treated shank. Clamp adjusts sideways on buttress-type serrations, cannot slip. Anvil of hardened and ground tool steel supports insert, prevents holder damage so common in brazed-on tools. Allen screw provides forward adjustment.



Stocked in 3 Styles, Several Sizes

Style 'B' (left above), for straight turning on lathe or boring mill (and for vertical work on planers) is made with shanks 1° by 1° up to 2° by 2° . Style 'F' for plunge cutting from the cross slide, and style 'G' for turning up to, or facing a shoulder are standard with shanks up to $1\frac{1}{2}^{\circ}$ by $1\frac{1}{2}^{\circ}$.



Designed for Special Applications

We are repeatedly called upon to furnish special CHIP-HOG production tools. These examples from our engineering files combine CHIP-HOG standard construction and parts with special double-insert holders.

Write us, or call our representative for your copy of the CHIP-HOG folder and price list.


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Tooling—Standard and Special

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Everyone recognizes this
as a sign of the quick way out...

And smart gear users know
this  is the sign of good gears
made to your specifications.

May We Send You Our Brochure?



"Gears... Good Gears Only"

THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

THERE ARE 21 BASIC INDUSTRIES and **Hendrick** serves them all!

That's right! Hendrick serves every one of the 21 basic industries designated by the U. S. Department of Commerce under its Standard Industrial Classification list. If you have a perforating problem and are not already familiar with Hendrick's facilities, we stand ready to serve you, too! Whatever your needs be, if you wish to perforate metal, rubber, plastic or masonite for a screening, straining, decorative, display or acoustical application, Hendrick's long experience can be of real help. Join the long list of manufacturers who now derive untold assembling and selling benefits by using Hendrick Perforated Metal as a fabrication material. Call Hendrick today.

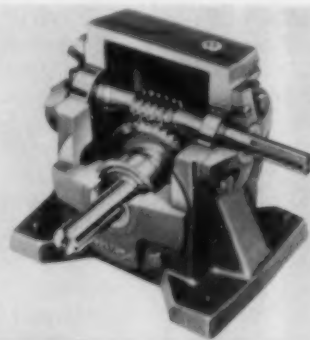
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37 DUNDAFF ST., CARBONDALE, PA. • Sales Offices in Principal Cities
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Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

NEW EQUIPMENT

and less space. Fins on housings improve heat dissipation. Fan cooling is optional on larger size reducers, except compound units.



Fifty-two standard stock models are available—283 different units with ratios from 5:1 to 3600:1; output torque ratings from 40 to 9400 in. lb. *Boston Gear Works.*
For more data circle No. 49 on postcard, p. 105.

Portable welders

Even a less-experienced operator can use the heavy-duty Hi-Amp Model 5403 portable electric welder successfully. Built-in electronic Thyatron timing control and solenoid contactor provides welding accuracy from 1/10th of a second to a full second, effectively preventing any danger of burning through the



work. Throat depth of 6 in. can be extended to 18 in. by extension arm accessories. Welder's opening is easily adjusted from 3 to 11½ in. Both transformer and welding arms are water-cooled. Welder output is 3 amps for secondary open circuit voltage and over 20,000 amps for short circuit. The welder weighs 55 lb and can be moved about by hand; carrying handle can be used with a sky hook. *Sittler Corp.*

For more data circle No. 50 on postcard, p. 105.



"WE CUT PRODUCTION COSTS WITH THE SURFINDICATOR*!"

PRODUCING PRECISION PARTS is a requirement at Hydraulic Press Manufacturing Company, Mount Gilead, Ohio. Thus, the company uses the Brush SURFINDICATOR to check surface finish on pumps, presses, valves, and cylinder parts. A regular inspection tool, the SURFINDICATOR is used 20 to 50 times a day.

HPM reports, "dollar savings in production resulting from use of the SURFINDICATOR." Inspection is speedy, accurate, definite. The human factor in estimating surface finish is eliminated.

The SURFINDICATOR, priced from \$685, is an invaluable inspection tool for any plant that must produce parts to specified finishes. You can meet specifications exactly—eliminate costly over-finishing, end guesswork. Let a Brush representative demonstrate the SURFINDICATOR in your plant—no obligation.

*Trade-Mark

BRUSH ELECTRONICS

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZOELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT AND COMPONENTS



COMPANY

Division of
Clevite Corporation

VARIETY OF SURFACE SPECIFICATIONS
USED BY DIFFERENT COMPANIES

	A	B	C	D	E	F	G	H
0								
2			1	10	VV			
4	b 1-20		2	9	VV			
8			3	8				
16			4	7				
32		GG	5	6	VVV			
63		G	6	5				
125		ff	7	4	VV			
250		f	8	3				
500			9	2				
1000		RG	10	1				

MICROINCHES

New Standard Eliminates Confusion in Surface Specifications

These individual methods of specifying surface finish can now be replaced by one uniform system with the new ASA and MIL-10 Standard. The Brush SURFINDICATOR is the only instrument completely meeting the new Standard.

Brush Electronics Company, Dept. 5-6

3405 Perkins Avenue, Cleveland 14, Ohio

☐ Please send booklet describing New ASA Standard B46.1,
and illustrating SURFINDICATOR.

☐ Have your representative call.

Name

Position

Company

Address

City State



SUPERIOR TUBING acts as a temperature and mechanical handling shield for delicate sub-surface, radioactive logging instruments.

SMOOTH SURFACES, CLOSE TOLERANCES, LIGHT WEIGHT: REASONS WHY SUPERIOR TUBING IS USED TO HOUSE THESE DELICATE WELL SURVEYING INSTRUMENTS

Well Surveys of Tulsa, Okla., purchases Superior Seamless Type 304 Stainless Tubing in large OD, light wall sizes and in 63 in. lengths. Into these tubes, which in the finished state vary from 28 to 31 in., radioactive well-logging instruments are inserted—instruments so delicate that stray electrical waves or gases leaking into the casing may throw them off.

For that reason, the tubing is supplied in the "as drawn" condition, with a smooth surface that has a high radiation factor. Stainless is specified because plated material used in the past flaked off and short-circuited the instruments. The thin wall size (2.098" x .018" wall) is important; first, because of weight

and, second, because of the close fit demanded. After the instruments are inserted, the tubing—closed by spinning—goes into an outer housing which must withstand pressures of 20,000 psi.

Whatever you want tubing for—an instrument housing, hypodermic needle, radio antenna, or heat exchanger—you'll find that the high quality of Superior tubing saves you time, money and production headaches. Send for your free copy of Bulletin 40—*A Guide to the Selection and Application of Superior Tubing*. SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa. On the West Coast: Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.



PRE-TESTING an assembly before it is inserted into the Superior tube.

Superior Tube

The big name in small tubing

All analyses .010" to 3/8" OD
Certain analyses in light walls up to 2 1/2" OD

The Iron Age SUMMARY . . .

Steel market will be tough for balance of the year . . . Automotive demand will increase . . . Mills having trouble with maintenance and labor.

No Relief in Sight . . . It's every man for himself in the steel market from now until the end of the year. The auto labor settlement blasted any chance that demand would ease enough to relieve the pressure to any significant degree. It's just not in the cards. The auto companies have cleared away the one big obstacle to a record-breaking year. They paid a price for it—and some of them are bitter—but they faced a choice of two evils.

So from here on in, the car producers will be leaning heavy on the throttle. Their expeditors are pushing steel mills to the limit for the simple reason that they need the steel to maintain production. Auto steel inventories are reported to be as low as five days.

Production at Peak . . . Coupled with this is the fact that steel mills have about reached the practical limit of their ability to produce. The ingot rate already is beginning to reflect downtime for long-deferred maintenance. Until this and vacations are out of the way, it's doubtful that production will do any better than hold its present pace. Chances are it will ease off slightly.

The mills are doing their best to see that no one gets hurt in the scramble. At least one producer has issued definite orders that none of its

customers will suffer from lack of steel. But it's tough going at best for some consumers. They are turning to warehouses and other sources.

Watch McDonald . . . The mills have their own troubles. Dave McDonald of the United Steel Workers is no paper tiger. He's making ominous sounds, both publicly and in pep talks with his lieutenants. Before the pushing and shoving is over, the steel industry will come perilously close to a strike.

It's a simple matter of prestige and economics for McDonald. He's bucking against the liberal settlement Walter Reuther won from the auto industry. And there's little love lost between McDonald and Reuther. Besides, McDonald has his own internal political problems. He's got to make a good showing for more than one reason.

Price Hike Coming . . . Watching from the sidelines, steel consumers are taking no chances. They're pressuring for immediate delivery as a hedge against a strike. They're also aware of the steel price increase that is bound to follow a wage settlement. If McDonald gets what he wants—between 12 and 15 cents—the price boost on a weighted average will be about \$4.50 per ton.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,340	2,320*	2,340	1,597
Ingot Index (1947—49=100)	145.5	143.0*	145.5	99.4
Operating Rates				
Chicago	98.0	98.0	98.0	79.0
Pittsburgh	100.0	98.0	99.0	69.0
Philadelphia	95.3	94.4	97.1	57.0
Valley	97.0	99.0	98.0	64.0
West	99.0	101.0*	100.2	77.0
Detroit	94.0	95.0*	94.0	36.0
Buffalo	105.0	105.0	105.0	67.5
Cleveland	103.0	101.0*	101.4	63.0
Birmingham	94.0	93.5	93.5	76.0
S. Ohio River	88.0	84.0*	88.8	82.5
Wheeling	98.0	99.0*	101.0	95.0
St. Louis	102.0	106.1*	106.1	65.5
Northeast	90.0	92.0	89.1	50.0
Aggregate	97.0	95.5*	97.0	67.5

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
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Composite price

Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$34.00	\$34.00	\$34.33	\$28.08

Nonferrous

Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	93.875	92.125	91.375	93.375
Zinc, E. St. Louis	12.00	12.00	12.00	11.00

No Letup Seen In Demand

Consumers hoping for an easier market later on can forget about it . . . Auto settlement has wiped out last chance for easier deliveries . . . No letup seen.

♦ ANY STEEL consumers who had been hoping for an easier market later this year can forget about it. The auto settlement removes perhaps the only chance that the scramble for some steel products would ease, if only temporarily.

What this means to consumers is that the wise thing is to step up their efforts to obtain deliveries from the mills and to place orders for future delivery wherever they can.

Reports from IRON AGE district editors indicate that there will be no letup in demand for balance of the year in virtually all products—at least for the so-called major products. Third quarter tonnage has been spoken for, and consumers are pressing the mills to take orders for the fourth quarter.

Furthermore, carryovers on such products as sheets, bars, plates, and structurals, are running at least 30 days, with some mills 45 days behind on deliveries. The volume of incoming business is such that there will be no opportunity for producers to take a breathing spell. If they are ever to become current, they will have to set aside 30 to 45 days' production or else carry the promised tonnages over into fourth quarter.

Whatever happens, the going is likely to be tough for those consumers who waited too long to get their orders to the producers. Warehouses, too, are beginning to show the wear and tear of trying to take care of their regular customers and at the same time accommodate strangers who normally obtain their requirements from the mills. On top of this, the warehouses are having trouble obtaining deliveries from their suppliers.

SHEETS AND STRIPS . . . From Chicago comes word that settlement of automotive wage talks has sent automotive buyers hot after sheets, wiping out most of the earlier reported cancellations. One mill has been forced to drop some tonnages from its 3rd quarter schedule completely. A sheet carryover of at least 60 days by July is expected. In Cleveland, shipments of hot-rolled and cold-rolled sheets are now running 6-7 weeks late. It appears there's little chance of much tonnage being booked for 4th quarter because of the overrun. Smaller tonnage items including galvanized, sheet and also silicon sheets are sold out for 4th quarter. Pittsburgh reports that carryovers from 2nd quarter on new sheet orders will be heavier than expected. This, coupled with the fact that some fall off in current orders is due to auto changeover period, will keep as much or more pressure on sheet facilities throughout 3rd and 4th quarters. In the East, delivery schedules on hot-rolled, cold-rolled and galvanized are reported very tight through Sept.

BARS . . . Demand in Detroit is still at a heavy pace with larger mills reporting 3rd quarter booked solidly. Some are asking for 4th quarter space. Smaller producers say they still have some open space, good for about two weeks. In the East, deliveries on all grades and sizes are

rapidly becoming more extended. A 3rd quarter close out is expected shortly by one producer. Limited input availability in Pittsburgh is causing some tightness in production of sufficient quantities of bars in all required sizes. In Chicago, producers are sold out for 3rd quarter, are on quota for 4th. There's mounting pressure from warehouses whose bar stocks are now low. On the West Coast, automotive is still No. 1.

STRUCTURALS AND SHAPES . . .

In the East, one producer reports delivery pattern on fabricated structural products is into November. Wide-flange, I-beams and standards lead the parade. Pittsburgh mills are reported turning away new orders for structurals with few exceptions. In Detroit, orders are behind 4-6 weeks with no sign of a letup.

PLATES . . . In Chicago, plate is sold out through 3rd quarter with considerable quantities reported now coming in from out-of-area. Low inventories at the warehouse level are helping to put the squeeze on this item. One Eastern producer reports September tonnage orders for universal, sheared and strip will not be released before July 1. His August delivery schedule is booked completely.

PIPE AND TUBING . . . One Detroit mill reports 3rd quarter order space is now filled with customers attempting to get on 4th quarter books. In Pittsburgh, both lap and butt weld are filling 3rd quarter order books at a healthy pace. Demand for oil country seamless tubing is far outstripping productive capacity.

WIRE PRODUCTS . . . On the West Coast, wire supply is reported tightening, while in Chicago, merchant wire demand continues at a good clip. Manufacturers wire is nearly sold out for 3rd quarter. In Pittsburgh, demand for manufacturers and construction wire continues to pressure production facilities to record proportions. Detroit reports that small auto suppliers are placing most orders for manufacturers wire.

WAREHOUSE . . . Smaller Chicago houses report no cutback in ordering thus far, though vacation time shutdown notices have started to come in. Feeling is that, although mills are going to keep shipping into customers through vacation shutdowns, warehouses will get their normal July setback. Some customers are reported specifying tonnages needed through Sept and into Oct.

Purchasing Agent's Checklist

- WAGES:** Auto settlement throws spotlight on steel p. 46
- STAMPINGS:** Midwest has a growing \$100 million market . . . p. 48
- EQUIPMENT:** Plant equipment outlays are soaring p. 50
- GEARS:** Spiroid gears feature near-zero backlash control p. 71

Comparison of Prices

(Effective June 15, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	June 14 1955	June 7 1955	May 17 1955	June 15 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.515
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tin and Terplate: (per base box)				
Timplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$8.95
Timplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terms	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.22
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Revering billets	\$54.00	\$54.00	\$54.00	\$52.00
Slabs, revering	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	June 14 1955	June 7 1955	May 17 1955	June 15 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.10	\$61.10	\$61.10	\$61.10
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cinc.	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	\$56.50	\$56.50	\$56.50	\$56.50
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$34.50	\$34.50	\$34.50	\$39.50
No. 1 steel, Phila. area	35.00	35.00	35.00	32.75
No. 1 steel, Chicago	32.50	32.50	32.50	32.00
No. 1 bundle, Detroit	27.00	27.00	27.00	26.00
Low phos., Youngstown	35.50	35.50	35.50	31.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	43.50	43.50
No. 1 mach'y cast, Philadel'a.	43.50	43.50	44.50	39.50
No. 1 mach'y cast, Chicago	45.50	45.50	46.00	41.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$34.00	\$34.00	\$34.33	\$28.08
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$13.25	\$13.25	\$13.25	\$14.38
Foundry coke, prompt	16.25	16.25	16.75	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	36.00	36.00	36.00	30.00
Copper, Lake, Conn.	36.00	36.00	36.00	30.00
Tin, Straits, New York	93.875¢	92.125¢	91.375	93.375
Zinc, East St. Louis	12.00	12.00	12.00	11.00
Lead, St. Louis	14.80	14.80	14.80	13.08
Aluminum, virgin ingot	23.20	23.20	23.20	21.50
Nickel, electrolytic	67.67	67.67	67.67	63.08
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50
† Tentative. ‡ Average. * Revised.				

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 152→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	.....
Birdsboro, Pa. B6	58.00	58.50	59.00	59.50	.....
Birmingham R3	52.35	52.85	.....	.....	.....
Birmingham W9	52.35	52.85	.....	.....	.....
Birmingham U4	52.35	52.85	54.50	.....	.....
Buffalo R3	56.00	56.50	57.00	.....	.....
Buffalo I11	56.00	56.50	57.00	.....	.....
Buffalo W6	56.00	56.50	57.00	57.50	.....
Chicago I4	56.00	56.50	56.50	57.00	.....
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50	57.00	.....
Dangerfield L3	52.50	52.50	52.50	.....	.....
Duluth I4	56.00	56.50	56.50	57.00	.....
Erie I4	56.00	56.50	56.50	57.00	.....
Everett M6	.....	61.00	61.50	.....	.....
Fentona K1	62.00	62.50	.....	.....	.....
Geneva, Utah C7	56.00	56.50	.....	.....	.....
Granite City C2	57.90	58.40	58.90	.....	.....
Hubbard Y1	.....	.....	56.50	.....	.....
Minneapolis C6	56.00	59.00	59.00	.....	.....
Monaca P6	56.00	.....	.....	.....	.....
Norfolk Is. P4	56.00	.....	.....	.....	.....
M. Tonawanda T1	56.00	56.50	57.00	.....	.....
Pittsburgh U1	56.00	.....	57.00	.....	.....
Sharpsville S3	56.00	56.50	56.50	57.00	.....
Se. Chicago R3	56.00	.....	56.50	.....	.....
Steelton B3	58.00	58.50	59.00	59.50	64.00
Svealand A2	58.00	58.50	59.00	59.50	.....
Teledo I4	56.00	56.50	56.50	57.00	64.00
Troy, N. Y. R3	58.00	58.50	59.00	59.50	.....
Youngstown Y1	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.50 pct); 50¢ per ton for each 0.50 pct manganese over 1 pct; \$2 per ton for 0.5 to 0.75 pct nickel; \$1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.

Silvery iron: Buffalo, H1, \$64.25; Jackson, J1, G1, \$65.00. Add \$1.00 per ton for each 0.50 pct silicon over base (0.61 to 0.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferroalloy prices are \$1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347 Ch	410	416	430
Ingot, re-rolling	16.75	17.75	19.25	19.00	29.75	23.50	35.50	14.00	—	14.25
Slabs, billets, re-rolling	21.00	23.25	25.25	24.50	38.00	30.25	46.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	46.25	—	31.00	31.75	41.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	46.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.50	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	26.25	—	27.0
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50	51.25	77.50	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md.; Middletown, O., A7; Massillon, O., R3; Gary, Ind.; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, J4; Philadelphia, D5.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; J. Lechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C3; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher) W1 (25¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, Ill.; Canton, O., F3; Ft. Wayne, J4; Philadelphia, D5.

Wire: Waukegan, Ill.; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monaca, Pa.; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatsville, Pa., C11; Philadelphia, D5.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

Price Pressure Builds Up

Mill prices hold, dealer prices advance in busy

Chicago market . . . Cleveland reports price gains . . . New buys strengthen Eastern prices.

◆ A MARKET squeeze seemed to be developing on several fronts as stationary mill prices bucked advancing dealer figures and tighter dealer offerings.

In Chicago shipments of dealer steel scrap were moving in quantity to the mills while brokers paid consumer delivered prices to cover orders. Large scale price increases seemed in the making.

In the East a similar story was reported: mill prices holding but brokers having trouble meeting commitments at the going rates. New York brokers say domestic and export traffic is moving nicely; they look for a good June.

In Cleveland, price of No. 1 heavy melting rose 50¢, indicating the strength of major centers is spreading. Cleveland has been consistently on the quiet side for the past few weeks.

THE IRON AGE Composite for No. 1 heavy melting held again at \$34.00.

Ferrous scrap consumption in April was 6,308,000 tons, slightly less than in March, according to Bureau of Mines figures. Of this, 3,487,000 tons were home scrap; 2,821,000 tons were purchased. Daily consumption increased 2 pct; the total melt consisted of 52.1 pct scrap and 47.9 pct pig iron—a slight gain for scrap.

Pittsburgh . . . Despite no new major transactions the market appears stronger this week. There are plenty of orders out at current prices and brokers are really stepping trying to fill them and still make a profit. While a good bit of the tonnages are being filled at regular commissions, there are reports that parts of these latest orders are being filled without the full dollar commission—some reportedly at the break-even point or less.

Blast furnace grades remain unchanged. The latest railroad lists were on the whole at least as good as last month with specialties up 50¢ a ton.

Chicago . . . With mill sales hanging fire the local market continued to show signs of improvement last week. Despite failure of mills to advance buying prices at press time, dealer prices had moved up to consumer delivered price levels in several steel-making grades and scattered advances continued in several other grades. Shipments of dealer steel were moving in great quantity to the mill. Purchases by brokers of No. 1 hvy melting at \$33, No. 2 hvy melting at \$29 and No. 1 dealer bundles at \$34, as well as No. 1 RR hvy melting at \$37.25, indicated the rebounding dealer market as brokers paid consumer delivered price to cover orders.

Philadelphia . . . A generally quiet market continues to prevail with the price of No. 1 heavy melting holding at \$35.50 tops. Reports of a limited quantity purchase by one district mill at \$37.50 for the top steelmaking grade is not viewed as affecting the overall buying picture at the moment.

New York . . . Everyone wants scrap in the New York market and brokers are looking for a good June. Strong pressure for price rises has not yet been reflected in higher consumer figures but covering orders at going prices is a problem, with No. 1 heavy melting particularly tight. Concentration of one mill on this grade has accentuated the supply pinch.

Detroit . . . There are increasing signs this week that the market is leveling off here. Brokers are still trying to fill orders received at the beginning of the month and in some cases are having trouble finding enough dealer scrap. No new buying has been reported and predictions now are that July automotive lists will not go up or down more than 50¢.

Cleveland . . . Local market took on firmer tone with auto settlements and dealers feeling more bullish. Brokers are being very cautious. They see the market hitting a crucial turning point in the next 2 weeks. Scrap intake of dealer yards off about 25 pct due to start of summer vacations and hot weather. One area mill closing down for 2 week vacation June 30. One Valley mill bought tonnage of No. 1 heavy melting at \$35 confirming price there. In Cleveland one mill selectively buying No. 2 bundles from 2 yards, paying over market price with heavy emphasis on quality. Mill has slowly increased bundle usage.

Birmingham . . . Bright spot in the scrap market is the demand for cast, which continues steady at unchanged prices. The steel scrap market is dull and the export market continues weak. Exporters are buying sparingly and holding, but are not actively quoting. No. 2 bundles are in over-supply and some are moving north out of the Carolinas. Brokers expect a further reduction in open hearth prices when mills next buy.

St. Louis . . . Steel operating rate continues at high, jumping to 101.6 pct during the week, and a steady flow of scrap continues to equal the melt. Machine shop turnings, cast iron borings and shoveling turnings, are up \$1 per ton, as a leading outside consumer who had been affected by a strike came into the market at the new price.

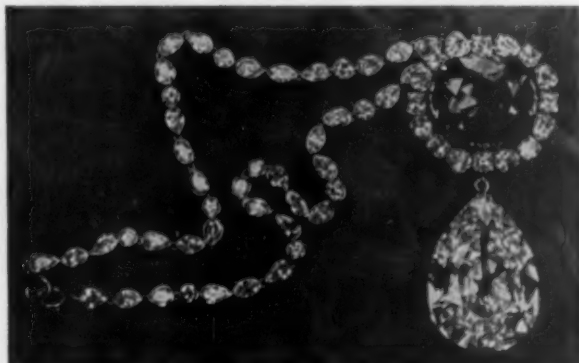
Cincinnati . . . Foundry business getting stronger weekly with railroad lists continuing upward rise. Recent tonnages of railroad wheels reached \$43 for 2700 tons after \$2.50 rise in few weeks.

Buffalo . . . Prices held firm in this area as consumers have been able to maintain scrap stocks in the face of steady operating rates:

Boston . . . Scattered buying in blast furnace grades sent prices of these grades up \$1 to \$1.50. At the same time, No. 1 machinery cast and mixed cupola cast were off \$1. Prices of steelmaking grades were unchanged and the market remains on the quiet side.

West Coast . . . All quiet on the scrap front in Seattle, San Francisco, and Los Angeles. Exporting is still heavy but everyone seems to be getting all the scrap needed. Prices are holding firm.

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Scrap Prices (Effective June 14, 1986)

Pittsburgh

No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	24.00 to 25.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and ma. turns.	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. punch'g, plate	37.00 to 38.00
Heavy turnings	32.00 to 33.00
No. 1 RR. hvy. melting	36.50 to 37.50
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	42.00 to 44.00
RR. spring steel	42.00 to 44.00
RR. couplers and knuckles	42.00 to 44.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 factory bundles	35.00 to 36.00
No. 1 dealers' bundles	33.00 to 34.00
No. 2 dealers' bundles	33.00 to 34.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Low phos. forge crops	39.00 to 40.00
Low phos. punch'g, plate	37.00 to 38.00
Low phos. 3 ft and under	36.00 to 37.00
No. 1 RR. hvy. melting	36.00 to 37.25
Scrap rails, random lgth.	43.00 to 44.00
Re-rolling rails	51.00 to 52.00
Rails 2 ft and under	48.00 to 49.00
Locomotive tires, cut	35.00 to 36.00
Cut bolsters & side frames	37.00 to 39.00
Angles and splice bars	44.00 to 45.00
RR. steel car axles	42.00 to 43.00
RR. couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	46.00 to 47.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	32.00 to 33.50
Cast iron brake shoes	23.00 to 24.00
Cast iron car wheels	37.00 to 38.00
Malleable	45.00 to 46.00
Stove plate	33.00 to 34.00

Philadelphia Area

No. 1 hvy. melting	\$34.50 to \$35.50
No. 2 hvy. melting	31.50 to 32.50
No. 1 bundles	34.50 to 35.50
No. 2 bundles	36.00 to 37.00
Machine shop turn.	20.50 to 21.50
Mixed bor. short turn.	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	27.00 to 28.00
Low phos. 5 ft and under	38.50 to 39.50
Low phos. 3 ft and under	40.00 to 41.00
Low phos. punch'g	40.00 to 41.00
Elec. furnace bundles	37.50 to 38.50
Heavy turnings	37.50 to 38.50
RR. steel wheels	40.00 to 41.00
RR. spring steel	40.00 to 41.00
Rails 18 in. and under	60.00 to 61.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	44.00 to 45.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	43.00 to 44.00
Charging box cast.	37.00 to 38.00

Cleveland

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	23.00 to 24.00
Cut struct'l & plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	31.50 to 32.50
Low phos. punch'g, plate	32.50 to 33.50
Foundry steel, 2 ft & under	38.00 to 39.00
No. 1 RR. heavy melting	35.00 to 36.00
Rails 3 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	26.00 to 27.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	43.00 to 44.00
Malleable	44.00 to 45.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. plate	35.00 to 36.00

Buffalo

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	24.50 to 25.50
No. 1 busheling	29.00 to 30.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	22.50 to 23.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	31.50 to 32.50
Cast iron borings	29.50 to 30.50
Low phos. plate	32.00 to 33.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	40.00 to 41.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$26.50 to \$27.50
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles, openhearth	24.50 to 25.50
No. 2 bundles	17.50 to 18.50
New busheling	26.50 to 27.50
Drop forge flashings	36.00 to 37.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Low phos. punch'g, plate	27.50 to 28.50
No. 1 cupola cast.	35.00 to 36.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	31.00 to 32.00
Automotive cast.	40.00 to 41.00

St. Louis

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	15.50 to 16.50
Cast iron borings	17.50 to 18.50
Shoveling turnings	17.50 to 18.50
No. 1 RR. hvy. melting	35.00 to 36.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.00 to 48.00
Locomotive tires uncut	36.50 to 37.50
Angles and splice bars	36.50 to 37.50
Std. steel car axles	36.00 to 37.00
RR. spring steel	37.00 to 38.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	34.00 to 35.00
Cast iron brake shoes	22.00 to 23.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.50 to 34.50

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$25.50 to \$26.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	25.50 to 26.50
No. 2 bundles	18.00 to 19.00
No. 1 busheling	25.50 to 26.50
Elec. furnace, 3 ft & under	31.00 to 32.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and short turn.	14.00 to 15.00
Shoveling turnings	15.50 to 16.50
Clean cast chem. borings	16.00 to 17.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	28.00 to 29.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$30.50
No. 2 hvy. melting	27.00
No. 2 bundles	\$22.00 to 23.00
Machine shop turn.	10.50 to 11.50
Mixed bor. and turn.	11.50 to 12.50
Shoveling turnings	13.50 to 14.50
Clean cast chem. borings	20.00 to 21.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	31.00 to 32.00
Charging box cast.	31.00 to 32.00
Heavy breakable cast.	33.00 to 34.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	31.00 to 32.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	43.00 to 44.00
Shoveling turnings	23.00 to 23.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	34.50 to 35.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$30.50 to \$31.50
No. 2 hvy. melting	27.50 to 28.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	21.50 to 22.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	32.00 to 33.00
Cast iron borings	17.50 to 18.50
Low phos. 18 in. & under	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	\$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	25.00
No. 3 bundles	21.00
Machine shop turn.	10.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	\$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	28.00
No. 2 bundles	22.00
No. 3 bundles	20.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. furn. 1 ft. and under	30.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	\$41.00 to 42.00

Seattle

No. 1 hvy. melting	\$33.00
No. 2 hvy. melting	29.00
No. 3 bundles	33.00
No. 1 bundles	19.00
No. 1 cupola cast.	35.00
Mixed yard cast.	25.00

Hamilton, Ont.

No. 1 hvy. melting	\$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	\$8.00
Mixed steel scrap	28.00
Bushings	29.00
Bush, new fact prep'd	32.00
Bush, new fact unprep'd	28.00
Machine shop turn.	16.00
Short steel turnings	31.00
Mixed bor. and turn.	\$18.00 to 17.00
Rails, re-rolling	43.00
Cast scrap	42.00 to 45.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Series of Price Hikes Coming

Peaceful settlement of auto contracts adds to pressure for price increases . . . Zinc may come first . . . Aluminum due for boost after its labor settlement . . . Copper may be up.

◆ **PRESSURE** is mounting under the nonferrous price lid and it may fly off soon. Price increase for zinc should come soon, and primary aluminum is due to be upped after a labor settlement for that industry is reached a few months from now. There is also a chance copper may break through its current 36¢ per lb price line.

Possibility of a price increase for zinc and aluminum existed before the auto labor contracts were worked out. But now that a peaceful settlement has been reached, the pressure for higher prices is strengthened considerably.

Agreement on new auto labor contracts without a strike means automotive demand for already scarce metals will continue strong.

Also, the United Auto Workers' overwhelming victory at the bargaining table can't miss making the United Steel Workers a lot tougher than was originally figured. This means USW boss Dave McDonald will hold out for a sizable wage increase so that he'll be able to say that his union did as well as the autoworkers. This directly affects aluminum, since labor settlements in that industry usually follow the pattern set by steel. It means aluminum producers will have to give in to higher wage demands, and the increased labor cost, as with steel, will be passed along to the consumer.

Rumors of possible price increase for zinc have been very strong for the last several weeks. Peaceful settlement of the auto labor negotiations which assures continued stiff demand for this metal should be enough to push it over the line.

Outlook for copper is less certain. A month or more ago, some in the industry were mentioning the possibility that the price might drop. More recently they've been saying prices will probably hold.

But as a result of the auto settlement, and with strong demand for copper virtually assured throughout the rest of the year, another price increase is a strong possibility. This is particularly true since the price of copper outside the U. S. continues to run between 5¢ and 6¢ per lb higher, despite efforts to bring it down.

Preliminary labor talks for this industry are now under way.

ALUMINUM . . . Early this week it seemed all but a certainty that the government would move to divert more aluminum from the stockpile (see p. 65). Action was expected this week or next.

Testimony to just how strong demand for aluminum really is shows up in recent statistics on production and shipments from the Aluminum Assn. Despite the clamor about severe shortages and action by the government to help relieve scarcities, aluminum producers in the first 4 months of the year turned out 501,106

tons of primary aluminum, compared with 469,502 tons for the same period last year when there was actually an over supply of the metal. Shipments of mill products during the first 4 months of the year showed a much greater gain. Plate and sheet shipments, for example, during the first 4 months of '55 totaled 220,004 tons, compared with 154,406 in the January-April period of '54.

Shipments of aluminum products during April of this year declined slightly from the previous month, but were still at a high level:

	Apr. '55	Mar. '55
Sheet and Plate, total	57,895	59,101
Non-Heat-Treatable	46,146	46,814
Heat-Treatable	11,749	12,287
Foil	8,166	8,337
Extruded Products, total	15,800	16,902
Soft Alloys	14,040	14,238
Hard Alloys	1,761	1,764
Tube, Drawn, total	3,858	3,891
Soft Alloys	3,552	3,606
Hard Alloys	295	285
Bar & Rod, Rolled	8,095	7,696
Wire, Other than Conductor	1,770	2,000
ACSA & Cable, Bare	4,744	5,079
Forgings	2,027	2,206
Castings, total	16,949	17,832
Sand	923	967
Permanent Mold	7,890	8,333
Die	8,185	8,533

Importance of aluminum to the steel industry is pointed up in recent findings by the American Iron & Steel Institute which show that more than 34,000 tons of aluminum were used by the steel industry last year.

LEAD, ZINC . . . Government last week sent telegrams to zinc and lead producers asking them to submit offers of metal for the stockpile. The government may get some lead, though the amount will be less than was received earlier in the year. Zinc shipments to the stockpile will be extremely small however, because producer's stocks have been cut considerably and demand continues to be very strong. American Zinc Institute figures show that producers' stocks of unsold zinc at 63,184 tons at the end of May, are the lowest they have been in 3 years. In May alone, stocks were cut by nearly 12,000 tons. Unfilled orders for zinc at the end of May amounted to 70,084 tons, compared with 65,127 tons at the end of April.

COPPER . . . President Eisenhower last week put his approval on new legislation continuing the suspension of import duty on copper. Suspension of the 2¢-per-lb levy is effective until June 30, 1958.

TIN . . . Texas City tin smelter will definitely be in operation until June 30, 1956. Following action by the Senate earlier this year, the House last week passed the bill authorizing continued operation of the smelter.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	June 8	June 9	June 10	June 11	June 13	June 14
Copper, electro, Conn.	36.00	36.00	36.00	36.00	36.00	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	36.00	36.00
Tin, Straits, New York	92.00	92.75	93.25	.....	93.875	93.875*
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices

*Tentative



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Nonferrous Prices (Effective June 14, 1955)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet			Plate
	0.032 in.	0.081 in.	0.249 in.	3.000 in.
1100, 3003.....	39.1	37.1	35.9	35.5
3004.....	44.0	29.8	28.1	37.5
5052.....	45.7	41.9	40.2	39.3
2024-O, OAL.....	49.4	40.8	39.3	39.4
7075-O, OAL.....	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to \$1.04; 24 to 26, 42.2¢ to \$1.35; 36 to 38, 49.8¢ to \$1.97.
Rod, Round: 10,000 lb, 4.064-4.6 in., 1100-F, 48.6¢; 40.1¢; cold finished, 0.375-8.499 in., 1100-F, 47.9¢ to 42.4¢.
Screw Machine Stock: Rounds, 2011-T3, 1/8-1 1/2 in., 63.5¢ to 60.1¢; 1/2-1 1/2 in., 49.9¢ to 46.9¢; 1 9/16-3 in., 46.7¢ to 42.7¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.5¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 56.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1 1/4-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 54.6¢; 4-6 in., 40.8¢ to 49.8¢; 6-9 in., 41.4¢ to 52.1¢.

Roofing sheet: Flat, per sheet, 0.032 in., 42 1/4¢ x 60 in., \$2.998; x 96 in., \$4.801; x 120 in., \$6.002; x 144 in., \$7.202. Coiled sheet, per lb, 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FSI-O 1/4 in., 59¢; 3/16 in., 60¢; 1/8 in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 79¢; 1/2 to 1/4 in., 62.5¢; 1 1/4 to 1.749 in., 59¢; 2 1/4 to 5 in., 54.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb; 1/2 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M, In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.3¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 56¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/2 lb, 10,000 lb; 1/2 to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.040 to 0.057 in. wall thickness: OD 1/4 to 5/16 in., \$1.46; 6/16 to 1/2 in., \$1.32; 1/2 to 3/4 in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD 1/4 to 1/2 in., 67¢; 1 to 2 in., 63¢; 3 to 4 in., 62¢. Other alloys higher. Base OD: Up to 1 1/2 in., 10,000 lb; 1 1/2 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$14.00-\$14.50; alloy \$16.50; Plate, HR, commercially pure, \$11.50-\$12.00; alloy, \$12.50-\$12.75; Wire, rolled and/or drawn, commercially pure, \$10.50-\$11.00; alloy, \$12.50; Bar, HR or forged, commercially pure, \$8.50-\$8.75; alloy, \$8.50-\$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR.....	102	78	99
Strip, CR.....	102	87	125
Rod, Bar, HR.....	87	69	93
Angles, HR.....	87	69	93
Plate, HR.....	97	82	95
Seamless Tube, 122.....	108	153	
Shot, Blocks.....	85		

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper.....	52.79	51.11	54.86
Copper, h-r.....	54.76	51.11	54.86
Copper, drawn.....	49.75	49.69	
Low brass.....	46.27	46.21	
Yellow brass.....	50.99	50.93	
Red brass.....	44.30	45.56	
Naval brass.....	52.78	52.72	43.09
Lead brass.....	53.73	47.83	49.89
Phos. bronze.....	73.63	73.53	
Muntz metal.....	48.14	45.95	45.20
Al silver, 10 pct.....	60.20	63.28	66.34
Beryllium copper, CR, 1.9% Be, Base.....			
2000 lb, f.o.b.....			
Strip.....			\$1.74
Rod, bar, wire.....			1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed.....	23.20
Aluminum pig.....	21.50
Antimony, American, Laredo, Tex.....	28.50
Beryllium copper, per lb cont'd Be.....	\$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be.....	\$72.75
Bismuth, ton lots.....	\$2.25
Cadmium, de'd.....	\$1.70
Cobalt, 97-99% (per lb).....	\$2.60 to \$2.67
Copper, electro, Conn. Valley.....	36.00
Copper, Lake, delivered.....	36.00
Gold, U. S. Treas., per troy oz.....	\$35.00
Iridium, 99.8%, dollars per troy oz.....	\$2.25
Iridium, dollars per troy oz.....	\$90 to \$100
Lead, St. Louis.....	14.80
Lead, New York.....	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig.....	28.50
Ingot.....	29.25
Magnesium, sticks, 100 to 500 lb.....	49.00
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$288 to \$291
Nickel electro, f.o.b. N. Y. warehouse.....	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel.....	60.75
Palladium, dollars per troy oz.....	\$20 to \$21
Platinum, dollars per troy oz.....	\$76 to \$79
Silver, New York, cents per troy oz.....	89.25
Tin, New York.....	93.875
Titanium, sponge, grade A-1.....	\$3.95
Zinc, East St. Louis.....	12.00
Zinc, New York.....	12.50
Zirconium, sponge.....	\$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot.....	34.50
No. 115.....	33.75
No. 120.....	33.75
No. 123.....	33.25
80-10-10 ingot.....	38.00
No. 305.....	36.25
No. 315.....	47.25
88-10-2 ingot.....	43.75
No. 210.....	39.75
No. 215.....	29.25
No. 245.....	31.75
Yellow ingot.....	
No. 405.....	
Manganese bronze.....	
No. 421.....	

Aluminum Ingot

(Cents per lb de'd 30,000 lb and over)

92-8 aluminum-silicon alloys.....	27.50-28.25
0.30 copper, max.....	27.25-28.00
0.60 copper, max.....	26.00-27.00
Piston alloys (No. 122 type).....	25.50-26.50
No. 12 alum. (No. 2 grade).....	26.00-26.00
108 alloy.....	27.00-28.00
195 alloy.....	27.75-28.00
13 alloy (0.60 copper max.).....	26.00-26.50
ASX-679.....	

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1-95-97 1/2%.....	26.00-27.00
Grade 2-92-95%.....	25.00-26.00
Grade 3-90-92%.....	24.50-25.00
Grade 4-85-90%.....	23.50-24.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper.....	44.92
Cast, oval, 15 in. or longer.....	43.515
Electrodeposited.....	29.78
Flat rolled.....	45.42
Brass, 80-20.....	
Cast, oval, 15 in. or longer.....	43.515
Zinc, flat cast.....	20.25
Ball, anodes.....	18.50
Nickel, 99 pct plus.....	90.50*
Cast.....	\$1.70
Silver 999 fine, rolled, 100 oz lots per troy oz., f.o.b. Bridgeport, Conn.....	94 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum.....	63.00
Copper sulphate, 99.5 crystals, bbl.....	12.83
Nickel salts, single or double, 4-100 lb bags, frt. allowed.....	31.25*
Nickel chloride, 300 to 400 lb.....	42.50*
Silver cyanide, 100 oz. lots, per oz.....	75 1/2
Sodium cyanide, 96 pct domestic 200 lb drums.....	19.25
Zinc cyanide, 100 lb drum.....	54.30
* Effective Jan. 3.	

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	32	31 1/2
Yellow brass.....	23 1/2	22
Red brass.....	28 1/2	27
Comm. bronze.....	23 1/2	23 1/2
Mang. bronze.....	22 1/6	21
Yellow brass rod ends.....	23 1/2	22

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	34 1/2
No. 2 copper wire.....	34
*Refinery brass.....	31 1/2
*Dry copper content.....	

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	35
No. 2 copper wire.....	33 1/2
Light copper.....	31 1/2
No. 1 composition.....	27 1/2
No. 1 comp. turnings.....	27
Roller brass.....	20 1/2
Brass pipe.....	19 1/2
Radiators.....	21 —21 1/2

Aluminum

Mixed old cast.....	15 —16 1/2
Mixed new clips.....	17 —18
Mixed turnings, dry.....	15 1/2 —17

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire.....	32 1/2 —33
No. 2 heavy copper and wire.....	31 —31 1/2
Light copper.....	29 —29 1/2
New type shell cuttings.....	29 —29 1/2
Auto radiators (unwashed).....	18 1/2 —19
No. 1 composition.....	24 1/2 —25
No. 1 composition turnings.....	24 —24 1/2
Unlined red car boxes.....	18 1/2 —19
Cocks and faucets.....	19 1/2 —20
Mixed heavy yellow brass.....	16 1/2 —17
Old rolled brass.....	18 —18 1/2
Brass pipe.....	19 1/2 —20
New soft brass clippings.....	21 1/2 —22
Brass rod ends.....	20 1/2 —21
No. 1 brass rod turnings.....	19 1/2 —20

Aluminum

Alum. pistons and struts.....	12 —12 1/2
Aluminum crankcases.....	12 —12 1/2
1100 (28) aluminum clippings.....	14 1/2 —15 1/2
Old sheet and utensils.....	12 —12 1/2
Borings and turnings.....	12 —12 1/2
Misc. cast aluminum.....	12 —12 1/2
2024 (24s) clippings.....	14 —14 1/2

Zinc

New zinc clippings.....	6 1/2 —7
Old zinc.....	4 1/2 —5
Zinc routings.....	3 1/2 —3 3/4
Old die cast scrap.....	3 1/2 —3 3/4

Nickel and Monel

Pure nickel clippings.....	75
Clean nickel turnings.....	60
Nickel anodes.....	75
Nickel rod ends.....	75
New Monel clippings.....	37 —38
Clean Monel turnings.....	27 1/2
Old sheet Monel.....	32 —33
Nickel silver clippings, mixed.....	18
Nickel silver turnings, mixed.....	16 1/2 —17

Lead

Soft scrap lead.....	11 1/2 —12
Battery plates (dry).....	6 —6 1/4
Batteries, acid free.....	4 1/2

Magnesium

Segregated solids.....	18 1/2 —19
Castings.....	17 1/2 —18

Miscellaneous

Block tin.....	75
No. 1 pewter.....	58 —59
No. 1 auto babbitt.....	48
Mixed common babbitt.....	14
Solder joints.....	17 —17 1/2
Siphon tops.....	40
Small foundry type.....	15 1/2 —16
Monotype.....	14 1/2 —15
Lino. and stereotype.....	13 1/2 —14
Electrotype.....	12 —12 1/2
Hand picked type shells.....	10 1/2
Lino. and stereo. dross.....	4 1/2 —5
Electro dross.....	3 1/2 —4

IRON AGE

STEEL
PRICES(Effective
June 16, 1955)

Italics identify producers listed in key at end of table. Base prices, f.a.b. mill, in cents per lb., unless otherwise noted. Extras apply

	BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.		\$86.00 B3		4.30 B3	6.45 B3	4.30 B3						
	Buffalo, N. Y.	\$64.00 B3	\$78.00 B3, R3	\$86.00 B3, R3	5.075 B3	4.30 B3	6.45 B3	4.30 B3	4.05 B3, R3	5.75 R7, S10	6.15 B3	8.425 B3	
	Claymont, Del.												
	Harrison, N. J.												12.45 C11
	Consolidated, Pa.							4.10 A2	5.80 A2	6.15 A2			
	New Bedford, Mass.								6.20 R6				
	Johnstown, Pa.	\$64.00 B3	\$78.00 B3	\$86.00 B3		4.30 B3	6.45 B3	4.05 B3					
	Boston, Mass.								6.30 T8				12.00 T8
	New Haven, Conn.								6.20 D1 6.50 A5				
	Phoenixville, Pa.					4.20 P2		4.30 P2					
	Sparrows Pt., Md.							4.05 B3	5.75 B3, T8	6.15 B3	8.425 B3		
	Bridgeport, Wallingford, Conn.	\$60.00 N8	\$83.00 N8					4.35 N8	6.26 W1			7.00 N8	
MIDDLE WEST	Pawtucket, R. I. Worcester, Mass.								6.30 N7 6.00 A5				12.75 A5 12.00 N7
	Alton, Ill.							4.225 L1					
	Ashland, Ky.							4.05 A7					
	Canton-Massillon, Dover, Ohio		\$80.00 R3	\$86.00 R3, T3									12.45 G4
	Chicago, Ill.	\$64.00 U1	\$78.00 R3, U1, W8	\$86.00 U1, W8, R3	5.075 U1	4.25 U1, W8	6.40 U1, Y1	4.25 U1	4.05 A1, N4, W8	5.85 A1, T8			12.45 T8
	Cleveland, Ohio									5.75 A5, J3		8.60 A5	12.45 A5
	Detroit, Mich.			\$86.00 R5				4.15 G3, M2	5.85 D1, D2, G3, M2, P11	6.25 G3	8.70 D2, G3		
	Duluth, Minn.												
	Gary, Ind. Harbor, Indiana	\$64.00 U1	\$78.00 U1	\$86.00 U1, Y1	5.075 T3	4.25 J3, U1	6.40 U1, J3	4.05 T3, U1, Y1	5.85 T3	6.15 U1, T3, Y1	8.60 Y1	6.70 U1, Y1	
	Sterling, Ill.							4.15 N4					
	Indianapolis, Ind.								5.90 C5				
	Newport, Ky.											6.70 Y3	
WEST	Middletown, Ohio								5.75 A7				
	Niles, Warren, Ohio Sharon, Pa.							4.05 S1, R3	5.75 S1, R3, T4	6.15 S1, R3	8.60 S1, R3	6.70 S1	12.45 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$64.00 U1, J3	\$78.00 J3, U1, C11	\$86.00 U1, C11	5.075 U1	4.25 J3, U1	6.40 J3, U1	4.25 U1	4.05 P6	5.75 B4, J3, S7		6.70 S9	12.45 S9
	Portsmouth, Ohio							4.05 P7	5.75 P7				
	Woriton, Wheeling, Follinsbee, W. Va.					4.25 W3		4.05 W3	5.75 F3, W3	6.15 W3	8.60 W3		
	Youngstown, Ohio		\$78.00 C10	\$86.00 Y1, C10		4.25 Y1	6.40 Y1	4.05 U1, Y1	5.75 Y1, C5	6.15 U1, Y1	8.60 Y1	6.70 U1, Y1	12.45 C5
	Fontana, Cal.	\$72.00 K1	\$86.00 K1	\$105.00 K1		4.90 K1	7.05 K1	5.25 K1	4.825 K1	7.50 K1	7.25 K1	8.10 K1	14.55 K1
	Geneva, Utah		\$78.00 C7			4.25 C7	6.40 C7						
	Kansas City, Mo.					4.30 S2	6.45 S2			6.40 S2		6.95 S2	
	Los Angeles, Torrance, Cal.		\$87.50 B2	\$106.00 B2		4.95 B2, C7	7.10 B2		4.80 B2, C7	7.80 C1			
	Minneapolis, Colo.					4.70 C6		5.15 C6					
	Portland, Ore.					5.00 O2							
SOUTH	San Francisco, Niles, Pittsburg, Cal.		\$87.50 B2			4.90 B2 4.95 P5	7.05 B2		4.80 B2, C7				
	Seattle, Wash.		\$91.50 B2			5.00 B2	7.15 B2		5.05 B2, P12				
	Atlanta, Ga.							4.25 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$64.00 T2	\$78.00 T2			4.25 C16, R3, T2	6.40 T2		4.05 R3, T2, C16	6.15 T2			
	Houston, Lone Star, Tex.	\$70.00 L3	\$83.00 S2	\$91.00 S2		4.30 S2	6.45 S2			6.40 S2		6.95 S2	

IRON AGE

STEEL
PRICES(Effective
June 15, 1966)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

	SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
	Hot-rolled 16 ga. hvyr.	Cold- rolled	Galvanized 16 ga.	Enamel- ing 12 ga.	Long Terne 16 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.85 B3	4.95 B3			6.10 B3	7.50 B3			4.675 W6	† Special coated mfg. turns deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 135 lb. deduct \$2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.10. Differ- ential 1.00 lb./0.25 lb. add 55¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.10 A2	5.00 A2			6.15 A2							
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									4.675 B3			
	Fairless, Pa.	4.10 U1	5.00 U1			6.15 U1	7.55 U1				\$8.90 U1	\$7.90 U1	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.95 B3	4.95 B3	5.45 B3		6.10 B3	7.50 B3	8.20 B3		4.775 B3	\$8.90 B3	\$7.60 B3	
MIDDLE WEST	Worcester, Mass.									4.975 A5			
	Trenton, N. J.												
	Altus, Ill.									4.85 L1			
	Ashland, Ky.	4.85 A7		5.45 A7	5.375 A7								
	Canton-Massillon, Dover, Ohio			5.45 R1, R3						5.175 R1			
	Chicago, Joliet, Ill.	4.85 A1, W8				6.10 U1				4.675 A5, N4,R3			
	Sterling, Ill.									4.775 N4			
	Cleveland, Ohio	4.85 J3, R3	4.95 J3, R3		5.375 R3	6.10 J3, R3	7.50 J3, R3			4.675 A5			
	Detroit, Mich.	4.15 G3, M2	5.05 G3			6.20 G3	7.60 G3						
	Newport, Ky.	4.85 N3	4.95 N3	5.45 N3									
	Gary, Ind. Harbor, Indiana	4.85 J3, U1,Y1	4.95 J3, U1,Y1	5.45 U1, J3	5.375 J3, U1	5.85 U1	6.10 U1, J3,Y1	7.50 U1, Y1		4.675 Y1	\$8.90 J3, U1,Y1	\$7.50 J3, U1,Y1	6.20 U1, Y1
WEST	Granite City, Ill.	4.25 G2	5.15 G2	5.65 G2	5.375 G2							\$7.60 G2	6.30 G2
	Kokomo, Ind.	4.15 C9		5.55 C9					5.20 C9	4.775 C9			
	Mansfield, Ohio					5.85 E2			5.175 E2				
	Middletown, Ohio		4.95 A7		5.375 A7	5.85 A7							
	Niles, Warren, Ohio Sharon, Pa.	4.85 S1,R3 5.30 N3	4.95 R3 5.975 N3	5.45 N3, R3	6.725 N3	5.85 N3	6.10 S1,R3	7.50 R3			\$8.90 R3	\$7.50 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.85 J3, U1,P6	4.95 J3, U1,P6	5.45 U1	5.375 U1		6.10 J3, U1	7.50 J3, U1	8.20 U1	4.675 A5 4.875 P6	\$8.90 J3, U1	\$7.50 J3, U1	6.20 U1
	Portsmouth, Ohio	4.85 P7	4.95 P7							4.675 P7			
	Weirton, Wheeling, Follansbee, W. Va.	4.85 W3, W5	4.95 W3, W5,F3	5.45 W3, W5		5.85 W3, W5	6.10 W3	7.50 W3			\$8.90 W3, W5	\$7.50 W3, W5	6.20 F3, W5
	Youngstown, Ohio	4.85 U1, Y1	4.95 Y1		5.375 Y1		6.10 U1, Y1	7.50 Y1		4.675 Y1			
	Fontana, Cal.	4.825 K1	6.05 K1			6.875 K1	8.55 K1			5.475 K1			
	Geneva, Utah	4.15 C7											
SOUTH	Kansas City, Mo.									4.925 S2			
	Los Angeles, Torrance, Cal.									5.475 C7, B2			
	Minneapolis, Colo.									4.925 C6			
	San Francisco, Niles, Pittsburg, Cal.	4.75 C7	5.00 C7	6.20 C7						5.325 C7	\$9.55 C7	\$8.25 C7	
	Seattle, Wash.												
	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.05 R3, T2	4.95 T2	5.45 R3, T2		6.10 T2			5.35 R3	4.675 T2, R3	\$8.90 T2	\$7.60 T2	
	Houston, Tex.									4.925 S2			

IRON AGE

**STEEL
PRICES***(Effective
June 14, 1955)*

Steel identity producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

	BARS						PLATES				WIRE
	Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	
EAST	Bethlehem, Pa.			5.075 B3	6.625 B3	6.45 B3					
	Buffalo, N. Y.	4.30 B3,R3	4.30 B3,R3	5.45 B5	5.075 B3,R3	6.625 B3,B5	6.45 B3	4.225 B3,R3		6.45 B3	5.75 W6
	Claymont, Del.							4.225 C4		5.00 C4	
	Coatesville, Pa.							4.225 L4		5.00 L4	6.45 L4
	Conshohocken, Pa.							4.225 A2	5.275 A2	6.45 A2	
	Harrisburg, Pa.							4.225 C3	5.275 C3		
	Hartford, Conn.		5.00 R3		6.925 R3						
	Johnstown, Pa.	4.30 B3	4.30 B3		5.075 B3		6.45 B3	4.225 B3		5.00 B3	6.45 B3
	Fairless, Pa.	4.45 U1	4.45 U1		5.225 U1						
	Newark, N. J.			5.05 W10		6.00 W10					
	Camden, N. J.			5.05 P10							
	Bridgeport, Putnam, Conn.	4.55 N8		5.05 W10	5.225 N8			4.475 N8			
	Sparrows Pt., Md.		4.30 B3					4.225 B3		5.00 B3	6.45 B3
	Palmer, Worcester, Readville, Mansfield, Mass.			5.05 W11 5.05 B3,C14		6.925 A5,B5					6.05 A5, W6
MIDDLE WEST	Alton, Ill.	4.50 L1									5.925 L1
	Ashland, Newport, Ky.							4.225 A7,N5		5.00 N5	
	Canton-Massillon, Mansfield, Ohio	4.40 R3		5.40 R2,R3	5.075 R3,T5	6.625 R2,R3,T5		4.225 E2			
	Chicago, Joliet, Ill.	4.30 U1, N4,W8,R3, P13	4.30 N4,R3, P13	5.40 A5,W10, W8,B3,L2	5.075 U1,R3, W6	6.625 A5,W8, W10,L2,B5		4.225 U1,W8, J3,A1,R3	5.275 U1	5.00 U1	6.45 U1
	Cleveland, Ohio	4.30 R3	4.30 R3	5.40 A5,C13		6.625 A5,C13	6.45 R3	4.225 J3,R3	5.275 J3		6.45 J3,R3
	Detroit, Mich.	4.40 G3 4.45 R5		5.40 R5 5.00 B5,P6 5.05 P3	5.075 R5 5.175 G3	6.625 R5 6.825 B5,P3 P6	6.55 G3	4.325 G3			6.55 G3
	Duluth, Minn.										5.75 A5
	Gary, Ind. Harbor, Crawfordsville	4.30 J3, U1, Y1	4.30 J3, U1, Y1	5.40 M5,R3	5.075 J3, U1, Y1	6.625 M5, R3	6.45 U1,J3, Y1	4.225 J3, U1, Y1	5.275 J3	5.00 U1, Y1	6.45 U1,J3, Y1
	Granite City, Ill.							4.425 G2			
	Kokomo, Ind.										5.05 C9
	Sterling, Ill.	4.40 N4	4.40 N4								5.05 N4
	Niles, Ohio Sharon, Pa.	4.30 R3					6.45 R3	4.225 S1,R3		5.00 S1	6.45 S1
	Pittsburgh, Pa. Midland, Pa.	4.30 J3, U1, C11	4.30 J3, U1	5.40 A5,C8, C11,J3 W10,B4,R3	5.075 U1,C11	6.625 A5,C11, W10,C8,R3	6.45 J3, U1	4.225 J3, U1	5.275 U1	5.00 U1	6.45 J3, U1
	Portsmouth, Ohio										5.75 P7
WEST	Weirton, Wheeling, Follansbee, W. Va.	4.30 W3						4.225 W3, W5			
	Youngstown, Ohio	4.30 U1, Y1, C10,R3	4.30 U1, Y1, R3	5.40 F3,Y1, C10	5.075 U1, Y1, C10	6.625 Y1,C10 6.045 F2	6.45 U1, Y1	4.225 U1, Y1, R3		5.00 Y1	6.45 Y1
	Emeryville, Cal.	5.05 J5	5.05 J5								
	Fontana, Cal.	5.00 K1	5.00 K1		6.125 K1		7.70 K1	4.875 K1		6.45 K1	7.15 K1
	Geneva, Utah							4.325 C7			6.45 C7
	Kansas City, Mo.	4.55 S2	4.55 S2		5.325 S2		6.70 S2				6.00 S2
	Los Angeles, Torrance, Cal.	5.00 B2,C7	5.00 B2,C7	6.05 R3	6.125 B2		7.15 B2				6.70 B2
	Minneapolis, Colo.	4.75 C6	4.75 C6					5.075 C6			6.00 C6
	Portland, Ore.	5.05 O2	5.05 O2								
	San Francisco, Niles, Pittsburg, Cal.	5.00 C7,P9 5.05 B2	5.00 C7,P9 5.05 B2				7.20 B2				6.70 C7
	Seattle, Wash.	5.05 B2,P12, N6	5.05 B2,P12				7.20 B2	5.125 B2		6.70 B2	7.35 B2
	Atlanta, Ga.	4.50 A8	4.50 A8								5.95 A8
	Fairfield, Ala. City, Birmingham, Ala.	4.30 T2,C16, R3	4.30 T2,C16, R3				6.45 T2	4.325 T2,R3			6.45 T2
	Houston, Ft. Worth, Lone Star, Tex.	4.55 S2	4.55 S2		5.325 S2		6.70 S2	4.55 L3 4.375 S2		5.05 S2	6.50 S2
SOUTH											6.00 S2

Steel Prices (Effective June 24, 1956)

Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Clad Metals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shifting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shifting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Cammer Steel Div., Birmingham
D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Dinton & Sons, Inc., Philadelphia
E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.
F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G1 Globe Iron Co., Jackson, O.

- G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Denver, O.
H1 Hanna Furnace Corp., Detroit
H2 Ingersoll Steel Div., Chicago
H3 Inland Steel Co., Chicago
H4 Interlake Iron Corp., Cleveland
J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.
K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Pottsville
K3 Koppers Co., Granite City, Ill.
L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-State Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crushy Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland
P1 Page Steel & Wire Div., Monaca, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.
R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roehling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.
S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Tunkin Steel & Tube Div., Canton, O.
T6 Trement Nail Co., Warehouse, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston
U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclope Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham
W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wycoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (per) f.o.b. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS							
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2 In.		3 In.		3 1/2 In.		4 In.	
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
STANDARD T. & C.																				
Sparrows Pt. B3	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0						
Youngstown R3	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0						
Fontana K1	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0						
Pittsburgh J3	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25
Alton, Ill. L1	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0						
Sharon M3	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0						
Fairless N3	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0						
Pittsburgh N1	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25
Wheeling W5	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0						
Wheatland W4	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0						
Youngstown Y1	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25
Indiana Harbor Y1	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0						
Lorain N2	23.75	6.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. B3	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0						
Youngstown R3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0						
Fairless N3	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0						
Fontana K1	14.25		16.25		20.25		20.75		21.25		21.75		22.25							
Pittsburgh J3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75
Alton, Ill. L1	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0						
Sharon M3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0						
Pittsburgh N1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75
Wheeling W5	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0						
Wheatland W4	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0						
Youngstown Y1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75
Indiana Harbor Y1	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0						
Lorain N2	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0		19.0	3.25	21.5	5.75

Threads only, butt-weld and seamless 2 1/2 pt higher discount. Plain ends, butt-weld and seamless, 3-in. and under, 4 1/2 pt higher discount. Butt-weld jubbars discount, 5 pt.
Galvanized discounts based on zinc price range of over 7¢ to 11¢ incl. per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/2, 1 3/4 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt. o.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.00¢ per lb.

(Effective June 14, 1955)

MERCHANT WIRE PRODUCTS

MERCHANT WIRE PRODUCTS

F.a.b. Mill	Standard & Coated Nails		Woven Wire Fence 9 - 12½ ga.		"V"- Fence Posts		Single Long Rails Two Galv. Baled and Treated Barbless Wire		March. Wire Ann'd	
	Cut	Cut	Cut	Cut	Cut	Cut	¢/lb.	¢/lb.	¢/lb.	¢/lb.
Alabama City R1	137	146			155	159	6.90	7.30		
Alquiappa, Pa. J3	137	149					6.90	7.45		
Atlanta 48	139	151			157	164	7.00	7.45		
Bartonville K2	139	151			157	164	7.00	7.55		
Buffalo W6							6.90	7.30		
Chicago, Ill. N4	137	150			155	163	6.90	7.475		
Cleveland 46	142						8.90			
Cleveland A5										
Crawfordsville M4	139	151			157	159	7.00	7.55		
Duono, Pa. A5	137	149			155	162	6.90	7.45		
Duluth 45	139	149	150		155	162	6.90	7.45		
Fairfield, Ala. T2	137	149			155	162	6.90	7.45		
Galveston D4	139									
Houston S2	142	154				164	7.15	7.70		
Johnstown, Pa. B3	137	149			162	6.90	7.45			
Joliet, Ill. A5	137	149			155	162	6.90	7.45		
Kokomo, Ind. C9	139	148			157	161	7.00	7.55		
Los Angeles B2							7.35			
Kansas City S2	142	156			161	164	7.15	7.50		
Minneapolis C6	142	151	155	160	164	172	7.95			
Menasha P6	137	151			163	6.90	7.45			
Moline, Ill. R3			165							
Pittsburg, Cal. C7	156	172			179	182	7.85	8.40		
Potomac P7							6.90	7.90		
Rankin, Pa. A5	137	149			162	6.90	7.45			
So. Chicago R3	137	146	150		170	169	6.90	7.30		
S. San Francisco C6							164	7.00	7.55	
Sparrows Pt. B3	139				157		6.90	7.55		
Struthers, O. Y1							7.20			
Wenester A5	143									
Williamport, Pa. S5			150							

Cut Nails, carloads, base \$8.30 per keg at Conshohocken, Pa. (A2). Galvanized products computed with zinc at 11.0¢ per lb. Exceptions: Alabama City and So. Chicago computed with zinc at 5¢; Chicago, zinc 12¢.

C-R SPRING STEEL

	CARBON CONTENT				
	Cents Per Lb				
	F.a.b. Mill				
	0.26	0.41	0.61	0.81	1.05
	0.40	0.60	0.80	1.05	1.35
Bridgeport, New Britain, Conn. <i>NB</i>	5.75	8.05	9.00	11.15	13.85
Buffalo, N. Y. <i>R7</i>	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. <i>59</i>	5.75	8.05	9.00	11.15	13.85
Cleveland <i>A5</i>	5.75	8.05	9.00	11.15	13.85
Detroit <i>D1</i>	5.85	8.25	9.20	10.95	
Detroit <i>D2</i>	5.85	8.25	9.20		
Harrison, N. J. <i>CII</i>	6.80	8.20	9.20	11.45	14.15
Indianapolis <i>C4</i>	6.80	8.20	9.20	11.15	13.85
New Castle, Pa. <i>B4</i>	5.75	8.05	9.00	10.95	
New Haven, Conn. <i>D1</i>	6.20	8.35	9.30	11.45	14.15
Pawtucket, R. I. <i>N7</i>	6.30	8.35	9.30	11.45	14.15
Riversdale, Ill. <i>A1</i>	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. <i>S1</i>	5.85	8.05	9.00	11.15	13.85
Trenton <i>R4</i>	6.75	8.35	9.30	11.25	13.40
Wallingford <i>W</i>	6.20	8.35	9.30	11.45	14.15
Worren, Ohio <i>T4</i>	5.85	8.05	9.00	11.15	13.85
Wurts, W. Va. <i>W3</i>	5.75	8.05	9.00	10.95	13.25
Worcester, Mass. <i>A5</i>	6.40	8.35	9.30	11.45	14.15
Youngstown <i>C5</i>	5.85	8.05	9.00	11.15	13.85

¢ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill		Size		Seamless		Elec. Weld	
		OD-In.	R.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.48	32.95	
	2 1/2	12	28.15	45.74	27.48	32.95	44.36
	3	12	44.05	52.82	42.72	51.23	
	3 1/2	11	51.43	61.66	49.88	59.81	
	4	10	68.29	51.88	46.24	79.43	
		2	13	28.33	33.97	27.48	
National Tube	2 1/2	12	44.05	52.82	42.72		
	3	11	51.43	61.66	49.88		
	3 1/2	10	68.29	51.88	46.24		
	4						
Pittsburgh Steel	2	13	28.33	33.97			
	2 1/2	12	38.15	45.74			
	3	12	44.05	52.82			
	3 1/2	11	51.43	61.66			
	4	10	68.29	51.88			

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over, (3) \$.25 delivery, (4) 1000 to 1999 lb, \$.25 delivery.

Miscellaneous Prices

(Effective June 13, 1955)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	\$1.64
18	4	1	—	5	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	6	—	1.29

High-carbon chromium73
Oil hardened manganese405
Special carbon37
Extra carbon21
Regular carbon26
Warehouse prices on and east of Mississippi are 2.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Base prices, cents per lb, f.o.b.

Cladding	Plate (A3, J2, L4)			Sheet (J2)
	10 gal	15 gal	20 gal	20 gal
304	28.36	30.95	33.60	29.75
316	33.40	36.10	38.80	42.75
321	30.90	32.65	35.30	34.25
347	32.20	35.40	38.60	44.25
405	23.90	27.50	31.10	—
410, 430	23.40	27.00	30.60	—

CR Strip (59) Copper 10 pct 2 sides 33.00 1 side 26.00

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

	Gross Ton
Openhearth lump	\$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	\$13.00 to \$13.50
Foundry, beehive (f.o.b. oven)	—
Foundry, oven coke	\$16.00 to \$16.50
Buffalo, del'd	\$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.50
Philadelphia, f.o.b.	24.00
Sweden, f.o.b.	24.00
Plainsville, Ohio, f.o.b.	25.50
Erle, Pa., f.o.b.	25.00
Cleveland, del'd	27.42
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	22.00	40	110	10.80
30	72	21.25	40	100, 110	8.80
16 to 18	72	21.50	36	110	8.60
14	72	22.00	30	110	8.60
12	72	22.25	24	78 to 84	8.60
10	60	22.75	20	80	8.60
7	60	23.00	17	72	9.80
6	60	25.80	14	72	10.20
4	40	28.50	10, 12	60	11.10
3	40	30.00	8	60	11.40
2 1/2	30	30.75	—	—	—
2	24	47.75	—	—	—

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount	
	Less Case	C.
1/2 in. & smaller x 4 in. & shorter	2	22
1/2 in. & smaller x 6 in. & shorter	+3	18
3/16 in. & 1/2 in. x 6 in. & shorter	+4	17
3/4 in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in. & shorter	+16	8
1/2 in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	25
Lag, all diam. longer than 6 in.	+2	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Base Discount	Discount, Case or Keg
3/4" or smaller	55	64
1/2" to 1 1/4" inclusive	58	66
1 1/2" to 1 3/4" inclusive	60	67 1/2

C.P. Hex. regular & hvy.

All sizes 55 64

Hot Galv Nuts (all types)

3/4" or smaller	58	50
1/2" to 1 1/4" inclusive	41	52 1/2

Finished, Semi-finished, Slotted or Castellated Nuts

All sizes 55 66

Rivets

	Base per 100 lb	Pct Off List
1/2 in. & larger	\$9.25	27
7/16 in. and smaller	—	27

Cap Screws

	Discount	
	H.C. Heat	Bright Treated
New std. hex head, packaged	—	—
1/2" x 6" and smaller and shorter	38	28
1/2", 3/4", 1" x 6" and shorter	15	1
New std. hex head, bulk*	—	—
5" x 6" and smaller and shorter	50	42
1/2", 3/4", 1" x 6" and shorter	32	21
* Minimum quantity per item:	—	—
15,000 pieces 1/2", 5/16", 3/8" diam.	—	—
5,000 pieces 7/16", 1/2", 9/16", 5/8" diam.	—	—
2,000 pieces 3/4", 1" diam.	—	—

Machine Screws & Stove Bolts

	Discount	
	Mach. Screws	Stove Bolts
Packaged, package list ...	33	42
Bulk, bulk list	—	—
1/4 in.	15,000-99,999	17 59
1/2 in.	100,000-199,999	25 43
& under	200,000 & over	32 67
5/16 in.	15,000-49,999	17 59
3/8 in.	50,000-99,999	25 63
1/2 in.	100,000 & over	32 67
All diam.	5,000-49,999	59
over 3 in.	50,000-99,999	62
long	100,000 & over	67

Machine Screw & Stove Bolt Nuts

	Discount	
	Hex	Square
Packaged, package list ...	30	32
Bulk, bulk list	—	—
1/4 in.	15,000-99,999	15 17
1/2 in. &	100,000-199,999	23 25
smaller	200,000 & over	31 33

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00) \$114.00
No. 1 Ohio 107.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 107.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50) 17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. \$120.00
Childs, Hays, Pa. 125.00
Chicago District 130.00
Western Utah —
California —
Super Duty —
Hays, Pa., Athens, Tex., Windham 137.00
Curtner, Calif. 155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 20.00
Silica cement, net ton, bulk, Hays, Pa. 22.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala. 21.00
Silica cement, net ton, bulk, Utah and Calif. —

Chrome Brick

Per net ton

Standard chemically bonded, Balt. \$86.00
Standards chemically bonded, Curtner, Calif. 96.25
Burned, Balt. 80.00

Magnesite Brick

Standard Baltimore \$109.00
Chemically bonded, Baltimore 97.50

Grain Magnesite

St. %-in., grains

Domestic, f.o.b. Baltimore —
In bulk fines removed \$64.40
Domestic, f.o.b. Chewelah, Wash., Luning, Nev. —
In bulk 38.00
In sacks 48.75

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio \$14.50
Midwest 15.10
Missouri Valley 13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill. Price, net ton; effective CaF₂ content.
72 1/2% \$44.00
70% or more 42.50
60% or less 38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots (for minus 100 mesh).
Swedish sponge iron c.i.f. —
New York, ocean bags 11.25¢
Canadian sponge iron, Del'd in East, carloads ... { 9.5¢
Domestic sponge iron, 98+% Fe, carload lots 0.5¢
Electrolytic iron, annealed, imported 99.5+% Fe 27.5¢
domestic 99.5+% Fe 36.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 53.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe, .63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe, .83.0¢ to \$1.48
Aluminum 31.5¢
Brass, 10 ton lots 29.50¢ to 36.50¢
Copper, electrolytic 51.50¢
Copper, reduced 51.50¢
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99% min., and quality, del'd... \$2.60
Lead 23.50¢
Manganese 57.0¢
Molybdenum, 99% 32.75¢
Nickel, unannealed 36.50¢
Nickel, annealed 96.50¢
Nickel, spherical, unannealed 93.50¢
Silicon 43.50¢
Solder powder 7.0¢ to 9.9¢ plus met. value
Stainless steel, 302 91.0¢
Stainless steel, 316 81.10
Tin 14.64¢ plus metal value
Tungsten, 99% (65 mesh) .. \$4.05
Zinc, 10 ton lots 17.5¢ to 25.0¢

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Ferroalloy Prices

(Effective June 11, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.
 0.025% C ... 36.00 0.15% C ... 32.75
 0.025% C ... 34.50 0.20% C ... 32.50
 Simplex ... 34.50 0.50% C ... 32.25
 0.06% C ... 34.50 1.00% C ... 32.00
 0.10% C ... 34.00 3.00% C ... 32.75
 65-69% Cr, 4-9% C ... 24.75
 62-66% Cr, 4-6% C, 6.9% Si ... 25.60

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.
 High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
 Carloads ... 26.85
 Ton lots ... 28.00
 Less ton lots ... 29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.
 0.10% max. C ... \$1.18
 0.50% max. C ... 1.16
 9 to 11% C ... 1.26

Low Carbon Ferrochrome Silicon

(Cr 24-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.30¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.
 40-53% Cr, 60-65% Si, 3.00 max. Fe.
 Carloads ... 19.00
 Ton lots ... 22.10
 Less ton lots ... 23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.
 16-20% Ca, 14-18% Mn, 53-59% Si.
 Carloads ... 20.00
 Ton lots ... 22.30
 Less ton lots ... 23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.
 Ton lots ... 17.50
 Less ton lots ... 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, 8-11% Mn, packed.
 Carload lots ... 14.60
 Ton lots ... 18.10
 Less ton lots ... 19.35

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
 Carload packed ... 17.50
 Ton lots to carload packed ... 18.50
 Less ton lots ... 20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.
 Producing Point
 Marietta, Mahtabula, O.; alloy,
 W. Va.; Sheffield, Ala.; Portland,
 Ore. ... 9.50
 Clairton, Pa. ... 9.50
 Sheridan, Pa. ... 9.50
 Philo, Ohio ... 9.50
 Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
 Briquets, delivered, 66 pct Mn:
 Carloads, bulk ... 11.85
 Ton lots packed ... 13.65

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
 Manganese Silicon
 16 to 19% 3% max. ... \$84.00
 19 to 21% 3% max. ... 86.00
 21 to 23% 3% max. ... 88.50
 23 to 25% 3% max. ... 91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
 95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
 Carload, packed ... 45.00
 Ton lots ... 43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
 Carloads ... 30.00
 Ton lots ... 32.00
 250 to 1999 lb ... 34.00
 Premium for hydrogen - removed metal ... 0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.
 Carloads Ton Less
 0.07% max. C, 0.06%
 P, 90% Mn ... 32.00 33.55 35.05
 0.07% max. C ... 29.95 31.80 33.80
 0.15% max. C ... 28.45 30.30 31.50
 0.30% max. C ... 26.95 28.80 30.00
 0.50% max. C ... 26.45 28.30 29.50
 0.75% max. C, 80-85%
 Mn, 5.0-7.0% Si ... 23.45 25.30 26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mo, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.
 Carload bulk ... 11.00
 Ton lots ... 12.65
 Briquet contract basis carlots, bulk, delivered, per lb of briquet ... 12.45
 Ton lots, packed ... 14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$85.00 gross ton, freight allowed to normal trade area, Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$88.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.
 Ton lots Carloads
 96% Si, 2% Fe ... 20.10 18.00
 97% Si, 1% Fe ... 20.60 18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.
 Carloads, bulk ... 6.55
 Ton lots ... 8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.
 25% Si ... 20.00 75% Si ... 14.40
 50% Si ... 12.00 85% Si ... 16.10
 65% Si ... 13.50 90% Si ... 17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
 Ton lots ... \$2.05 2.95 \$3.75
 Less ton lots ... 2.40 3.30 4.55

Ferrovandium

35-55% contract, basis, delivered, per pound, contained V.
 Openhearth ... \$2.00-\$2.10
 Crucible ... 3.10-3.20
 High speed steel (Primos) ... 3.30-3.25

Alaifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.
 Carloads ... 9.25¢
 Ton lots ... 10.15

Calcium molybdate, 46.3-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo ... \$1.28

Ferrocolumbium, 50-60%, 2 in.

x D contract basis, delivered per pound contained Cb.
 Ton lots ... \$12.00
 Less ton lots ... 12.05

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta ... \$6.25

Ferromolybdenum, 55-75%, 200-lb

containers, f.o.b. Langeloth, Pa., per pound contained Mo ... \$1.46

Ferrophosphorus, 23-

26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton ... \$90.00
 10 tons to less carload ... \$110.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... \$1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... \$1.50
 Less ton lots ... \$1.55

Ferrotitanium, 15 to 18% high

carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... \$177.00

Ferrotungsten, 1/4 x down,

packed, per pound contained W, ton lots, f.o.b. ... \$3.80

Molybde oxide, briquets, per lb

contained Mo, f.o.b. Langeloth, Pa. ... \$1.27
 bags, f.o.b. Washington, Pa., Langeloth, Pa. ... \$1.24

Silmanol, 20% Si, 20% Mn, 20%

Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.
 Carload, bulk lump ... 15.50¢
 Ton lots, packed lump ... 16.75¢
 Less ton lots, lump, packed ... 17.25¢

Vanadium Pentoxide, 86 - 89%

V₂O₅ contract basis, per pound contained V₂O₅ ... \$1.28

Zirconium, contract basis, per lb

of alloy, 35-40%, f.o.b. freight allowed, ton lots ... 26.00¢
 12-15%, del'd, lump, bulk-carloads ... 8.00¢

Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3.14%, Si, 40-45%, per lb contained B ... \$5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound ... 45¢
 Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2%,

Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
 Ton lots per pound ... 10.00¢

Ferroboreon, 17.50% min. B, 1.50%

max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots ... \$1.20
 F.o.b. Wash., Pa.; 100 lb up
 16 to 14% B85
 14 to 19% B ... 1.20
 19% min. B ... 1.50

Grainal, f.o.b. Bridgeville, Pa.,

freight allowed, 100 lb and over.
 No. 1 ... \$1.00
 No. 6 ... 63¢
 No. 79 ... 80¢

Manganese - Boron, 75.00% Mn,

15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
 Ton lots ... \$1.46
 Less ton lots ... 1.57

Nickel-Boron, 15-18% B, 1.00%

max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... \$2.05

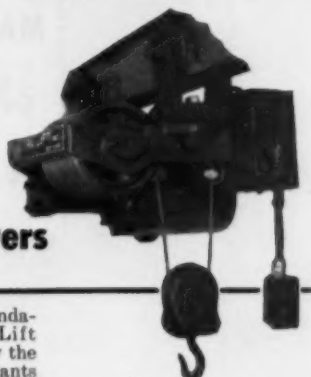
Silica, contract basis, delivered.

Ton lots ... 45.00¢

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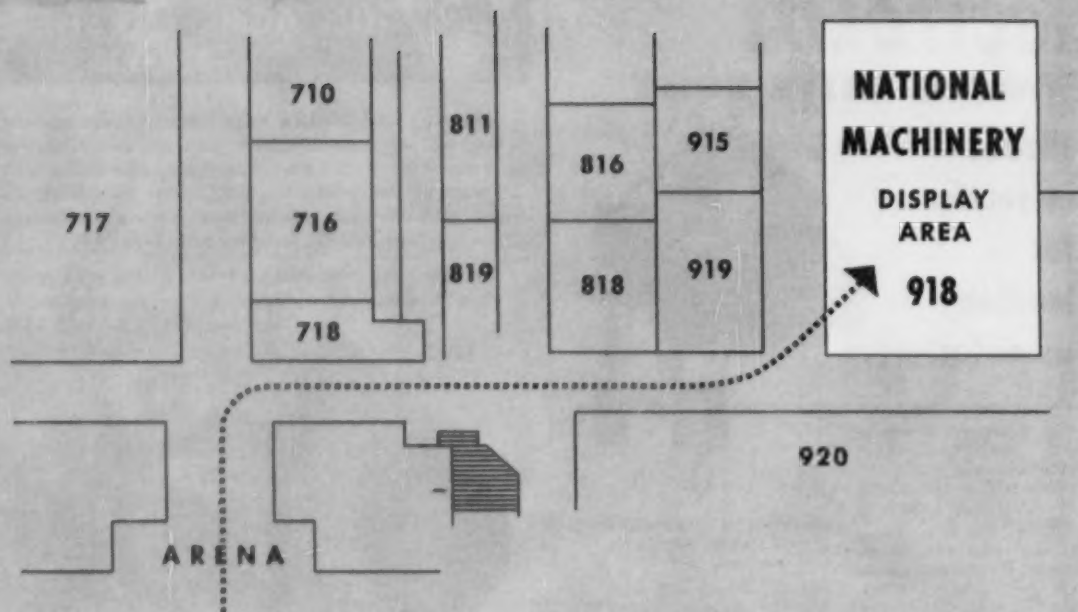
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How the Steel Industry Is Fighting Air Pollution



When the public hears about dust and fume control it is often in terms of what has not been done. It is important that they should also know what has been done, because the record of the steel industry is one of the most progressive.

The purpose of this discussion is to give the executives the facts to prove this point.

Q. First of all, how can you measure the progress of dust and fume control in the iron and steel industry?

A. As you know, there are many ways to combat air pollution. Equipment and methods vary in effectiveness, but the industry agrees that electrical precipitators have the highest collection efficiencies. By keeping track of the demand for this high efficiency equipment over the years, we can get a good indication of the importance the industry places on dust and fume control and the progress they are making.

Q. Do these figures show an increasing interest in this high efficiency equipment?

A. Suppose we let the figures speak for themselves. Since 1945 precipitator capacity in the steel industry had a greater increase than in any previous ten year period. Precipitators handling about 6½ million cfm were installed during this period.

Q. But can't you attribute this growth to the increase in steel-making capacity?

A. Some of this growth is due to expanded production facilities, but that's just a part of it. For instance, iron and steel production has increased about 30% since 1945 — but precipitator capacity has increased about 130% during this same period.

Q. In the old days, I guess precipitators were used primarily in blast furnaces, weren't they?

A. That's right. The first one went into operation in 1930. Since then, 169 Research Cottrells have been ordered by the industry.

Q. What about new applications?

A. We have a number of new uses that have proven themselves on the job. Open hearths, for instance. In one installation, our precipitators reduced stack discharge to a little over 2 pounds per hour. That's quite a reduction when you consider that the discharge without a precipitator ranged from 75 to 245 pounds per hour.

Q. I understand your Cottrells are used on some sintering machines now. Is this true?

A. Yes, we have three in operation and more under construction.

Q. How about scarfing machines?

A. This is a recent application which has worked out very satisfactorily. Two precipitators are now in operation on this application.

Q. Has anything been done on such problems as iron cupolas, electric furnaces, and ferromanganese blast furnaces?

A. Yes. Installations have been made on all these problems.

Q. How do you go about developing these new applications?

A. We work very closely with our customers on these new projects. Our laboratory is a big help, and our 40 years of pilot plant experience plus over 2,000 precipitators give us the kind of experience that leads to the successful engineering of projects like these.

If you would like to have more information about these applications, or if you want to investigate the possibility of using precipitators on other equipment, our nearest representative will be glad to call on you.

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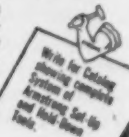


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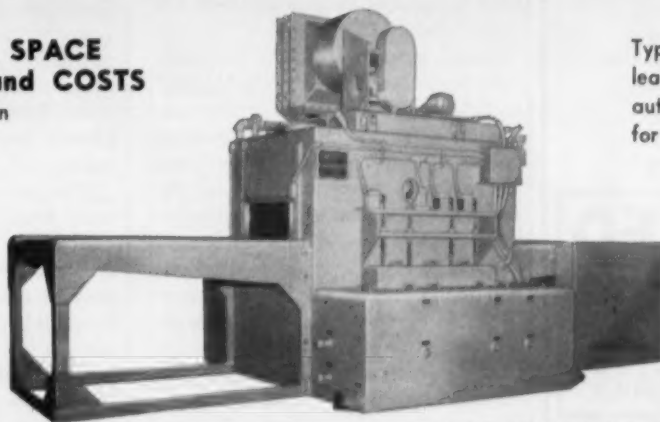
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News of Used and Rebuilt Machinery

Ohio Plants Hurry . . . Pressure on metalworking firms for fast delivery is perking up the used machinery business markedly in large, long-lead-time machinery. Smaller general purpose equipment is still in the doldrums, however, due to fast deliveries by machine tool makers and continued government surplus sales, according to Frank Laurens, Cincinnati machine tool dealer.

Used machines such as \$100,000 planers, large boring mills, and king-size lathes are finding a ready market these days when they can be located by dealers. Biggest demand is from larger companies faced with a chance of a major contract on short term delivery.

Delivery Draws Buyers . . . In many cases these larger firms which ordinarily order new machines only, find delivery the limiting factor and shop extensively for used models in good condition. Although most prices are individually negotiated, it is probable that a 2-3-year-old machine in top condition will command a price of up to three-fourths of its original price. In most cases these can be brought into production far sooner than custom built new machines thus starting to pay their keep earlier. Dealers' main problem is in locating this type of large capital investment equipment since firms which use it are seldom found liquidating. Some dealers have held the machines in inventory for 2-3 years and are now finding a firm market.

Small Models Lag . . . Smaller general purpose and special equipment, on the other hand, remain quite a glut on the market in Cincinnati, according to Mr. Laurens. Some types such as gear grinders are going for little more than scrap value at government surplus sales and liquidations. In the current scrap market they are not worth much on a dead weight basis

either. At some sales as few as one in 50 of these machines have been bought for re-use.

Although overall used machinery sales this year are slightly over last year, the rise has not been comparable to the rest of the metalworking trades, Mr. Laurens told THE IRON AGE last week. The rise can be attributed in some cases to some "breaks" when dealers were able to locate a scarce and sorely needed machine.

Biggest single class of customers for used machinery salesmen continues to be medium sized general machine shops doing subcontract work.

Spurn U. S. Tools . . . The foreign market for used machine tools has become almost completely reversed in the past year with the revival of the giant German industry in particular, according to Mr. Laurens. Where last year European metalworking firms sought out used U. S. tools at prices equal to or under their own, local production machines have been so improved they are spurning U. S. machines.

Production is also at its peak so local firms in Europe can equal or beat U. S. deliveries. In addition, U. S. machine toolmakers have started local plants in Europe at lower labor rates.

Name Officers . . . New officers of Machinery Dealers National Assn., named at the annual meeting in Cincinnati, are: Benjamin Weiss, president; R. Douglas Williams, 1st vice president; Robert W. Rice, 2nd vice president; Austin D. Lucas, treasurer; Richard M. Nathans, past president.

Speaking at Cincinnati John Williams, of Defense Dept., told MDNA members the military departments had inventoried 262,700 machine tools in their inspection program. He accepted a suggestion that a dealer committee work with the Defense Dept. on standards.

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

8" x 1/2" Bertsch Initial Type
8" x 1/2" Webb 9L-3 Initial Type
12" x 1/2" Hillies & Jones Pyramid Type
14" x 1/2" Williams & White Pyramid Type
16" x 1/2" Bertsch Initial Type Bending Roll
20" x 1" Hillies & Jones Pyramid Type Bending Roll

BRACKS—LEAF TYPE

8" x 1/2" Dreis & Krump Size 180
12" x 1/2" Dreis & Krump Motor Driven
14" x 1/2" Dreis & Krump No. 268

BRACKS—PRESS TYPE

12" All Steel Press Brake, 250 ton Capacity

CAR FULLER

Clyde Double Drum Electric Car Fuller, Capacity 43,750# Max. Starting Pull

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H Trav-Lift 20' Span 220/440 A.C.
5 ton Northern 31' Span 220/3/60 A.C.
5 ton Toledo 60' Span 220 Volt D.C.
5 ton Cleveland 60' Span 220 Volt D.C.
7 1/2 ton Shepard-Niles 22' Span 220/3/60 A.C.
10 ton P&H 35' Span 220 Volt D.C.
10 ton Shaw 72' Span 220 Volt D.C.
10 ton Northern 72' Span 220 Volt D.C.
15 ton Shaw 72' Span 220 Volt D.C.
20 ton P&H 60' Span 220 Volt D.C.
With 5 ton Auxiliary
20 ton Whiting 60' Span 220 Volt D.C.
20 ton Niles 60' Span 220/3/60 A.C.
125 ton Cleveland 60' Span 220 Volt D.C.
With 3 Trays 62 1/2 ton & 10 ton Aux.

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25 ton Henry & Wright, 1 1/2" Stroke, Double Roll Feed, Scrap Shear

DRAW BENCHES

20,000# Standard Double Draw, 48" Length of Draw
100,000# Poole Draw Bench, 39" Length of Draw

FORGING MACHINES

1" 1 1/2" 2 1/2" Ajax
1" 1 1/2" 3 1/4" 4" 5" Ajax
5" National 7 1/2" National—Air Clutch

FURNACE—HEATING

Induction Heating Corp. Ther-Monic Induction Heater, Model 1400, New 1954

FURNACE—MELTING

1 ton Whiting Hydro Arc, Top Charge

HAMMERS—BOARD DROP

3600 lb. Chambersburg Model J, Motor Driven
4000 lb. Chambersburg Model F
4000 & 5000 lb. Erie

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELERS—ROLLER

52" Aetna Standard 17 Rolls 2 1/2" Dia.
52" McKay 17 Rolls 4 1/2" Dia.
54" Aetna Standard 17 Rolls 4 1/2" Dia.
60" Aetna Standard 17 Rolls 4 1/2" Dia.
72" McKay 15 Rolls 4 1/2" Dia.
70" Voss-Ungerer, 23 Work Rolls 2.165" Dia. Capacity 22 to 13 Gauge Mild Steel

PRESSES—HYDRAULIC

500 ton Wood 4-Columns, 21" Stroke, 75" x 90" Between Columns
500 ton HPM Fastverse 4-Col. Press, 42" Stroke, 51" Daylight, Roller 48" x 72"

PRESSES—INCLINABLE

20 1/2" Niagara, 150 ton, 13" Stroke
Cleveland, 195 ton, 12" Stroke

PRESSES—STRAIGHT SIDE

2004 Niles, 5" Stroke
2008 Niles, 255 ton, 14" Stroke
2008 Niles, 290 ton, 16" Stroke, Bed Area 106"x60"

PRESS—TOGGLE

750 ton Niles-Toledo Model 181-R Toggle Action Press, 42" Ram Stroke, 20" Blankholder Stroke, Bed Area 120"x65" Front 60" Rear 60"

PUNCH & SHEAR COMBINATIONS

Style EF Cleveland, 36" Throat, Punch 1 1/4" thru 1" No. 24 Buffalo Universal Ironworker
Style W Cleveland, Single End, 60" Throat, 212 Ton With Attachment for Dishless Heads

ROLLING MILLS

8" x 12" Blake & Johnson Single Stand Two High
10" x 14" United Three Stand Two High
12" x 16" Waterbury Farrel Temper Mill
14" x 20" Farrel Birmingham
16" x 20" Waterbury Farrel Single Stand Two High
18" x 26" Poole Two Stand Two High
20" x 28" Three High Breakdown Mill

SHEARS—GATE

48" x 1 1/2" Mackintosh-Hemphill
80" x 3/4" Peis
80" x 1 1/2" Birtcher

SHEARS—ANGLE

60x1" Long & Allstatter Size B
80x1" Long & Allstatter Size C

SHEAR—BAR

29 Buffalo Bar Cutter, Capacity 3" Sq., 3 1/2" Rd.

SHEAR—GUILLOTINE

25 Hillies & Jones, Capacity 4 1/2" Round, 4" Square

SHEARS—ROTARY

4/10 Quickwork Rotary Shear, 36" Throat
1/2" Kling #250, With Flange Attachment
1/2" Quickwork Whiting #40A—NEW 1953
1/2" Kling #2750, 48" Throat, Circle Cutting Attch.
1/2" Kling No. 100, 48" Throat, Juggling Rolls In

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10" x 10 1/2" Cincinnati
10" x 1 1/2" Niagara No. 810
10" x 12 Ga. Niagara No. 510B
12" x 3/4" American
150" x 3/4" Hirdelson

SLITTERS

26" Yoder Slitting Line with Collars
28" Paxson Coil & Sheet Slitter
38" Concor Bolt Slitting Line, with Collars & Level

STRAIGHTENERS

22 Taylor Wilson Cross Roll Straightener, Capacity 1/2" to 1 1/2" Bars or 2" Tubing
23 Halden Straightening & Cut-Off Machine, Capacity 9/32" to 1/2" dia., 20 ft. Cut-off

SWAGING MACHINES

23 Langeller, Capacity 1/2" Tubing
24 Langeller, Capacity 2" Tubing

TESTING MACHINES

5,000 lb. Olsen Hydraulic LaCap Universal
2,000 lb. Niles Model PM-2 Universal
10,000 lb. Tinius Olsen Universal
50,000 lb. Baldwin Southwest Comp. Testing Machine
100,000 lb. Tinius Olsen Universal
200,000 lb. Tinius Olsen Compression, Portable

THREAD ROLLER

Model A32 Reed Thread Roller, Horizontal, Capacity Approx. Work Dia. In-Feed, Standard Equip. 1" to 4"

TRIMMER

No. 4387 Quickwork Whiting Stamping Trimmer

UNCOILER

60-36 Littell Uncoiler, Motor Driven, Coil Capacity 6000 lbs., Max. Coil Width 36"

WELDER

200 KVA Progressive Univ. Seam Welder, 220 v. 60 cps

WIRE DRAWING MACHINE

Synco B36 Wire Drawing Machine 14 Dia. Motor Drive, Spooler and Blocks Incl. Max. capacity coiling 105", finish min. .0164" low carbon steel

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36" & 42" Bullard vertical turret lathes.
No. 2 P. & W. Jig Borer, Model 127B.

DRILLING MACHINES

9" arm 16" col. American radial, H. D. 4 arm 13" col. Fastid Hyd., new 1941.

GRINDING MACHINES

16"x20" Landis gas type cyl. grinder, hyd.
40" No. 1542 Blanchard 24" rot., new 1940.
72" Colonial broach grinder, Late
72" Hanchett 3-spd. rotary surface, new 1940.
6" 18" Landis cyl. 30 deg. 4 Hand, 1941.
16" x 96" Landis gas type cylindrical, new 1941.

LATHES

No. 5 Jones & Lamson ram type univ. turret (2) lathes.
14" x 9" Hendey Toolroom, 1940.
15" x 30" Ligo Carbo-Matic, 1942.
8" x 18" Hendey Press., Tool & Gauge, 1940.

MILLS

1-19 Cincinnati production.
No. 2 Kearney & Trucker plain.
1-2-3-4-5-6 knee type plain & vertical.
42" x 42" x 18" Ingersoll adj. planer type.
60" x 48" x 16" Ingersoll adj. rail planer type.
No. 2H K & T plain horiz., new 1942.

PLANERS

36" & 60" Rockford Hyd. Opemide Shaper-Planers.
45"x48"x10" Gray Mxal-Servico.

PRESSES

150 ton No. 6 Bliss S.S. D.C.
200 ton No. 7D Bliss S.S. D.C.
150 ton No. 12-1 Cleveland 981, idc type.
300 ton No. 1039 Hamilton D.C., adj. bed, 60" x 162".
400 ton No. 605 Toledo K-J coining or embossing.
545 ton No. H3612 1/2" Hamilton Forging Press.
1900 ton No. 605 Toledo coining or forging.

SHAPERS

8" Pratt & Whitney vertical, Late.
24" G & E Hi-Duty universal.
32" G & E Invariable, F.M.D., late type.

UPSETTERS

1 1/2" Natl. coin. slides, auto-lob, guided ram.
3 1/2" Ajax, suspended slides, steel frame.
3" Ajax, suspended slides, steel frame.

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D. C. MOTORS				
Gu.	H.P.	Make	Type	Volts RPM
1	3500	Whas.	Tandem	550 600
1	2200	G.E.	MCF	600 400/500
2	1500	Waco	Bar.	600 600
1	1400	G.E.	MCF	600 63/180
1	1200	G.E.	MCF	600 750/950
1	1000	G.E.	MCF	600 350/700
1	940	Whas.	QM	250 140/170
1	800	Whas.		250 450/550
1	600	Al. Ch.		250 400/500
1	500	Whas.	CC-216	600 350/900
1	500	G.E.	MCF	250 300/900
3	450	Whas.		550 415
1	350	Whas.		250 340/600
1	250	G.E.	MPC	230 400/600
1	200	Rel.	1970T	230 729
3	200	G.E.	CD-1050Z	230 500/1500
1	200	Whas.	CB-5113	250 400/800
1	150	G.E.		600 250/750
1	150	Cr. Wh.	05H	230 1150
0	150	Cr. Wh.	8311-TEPC	230 800
1	150	Whas.	RE-151B	230 900/1000
1	120	Whas.	WK-201	230 600/950
1	120	G.E.	MCF	230 250/1000
1	120	Whas.	WK-141	230 500/1500
1	120	Whas.	WK-180	230 850
1	120	G.E.	MDR-418	230 415

M-G Sets—3 Ph. 60 Cy.

Gu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/2400	G.E.	450	250/200	2300/4600
1	1750/2100	G.E.	514	250/200	2300/4600
1	2000	G.E.	800	250 600	11000
1	2000	G.E.	514	600	6000/12000
1	2000	G.E.	800	600	2300/4600
1	1500	G.E.	730	600	6000/12000
1	1500	C.W.	514	30/115	4000/12000
2	1000	G.E.	730	600	2300/4600
2	750	G.E.	730	275	2300/4600
1	750	C.W.	514	30/115	2300
1	600	G.E.	730	250	440/2300

TRANSFORMERS

Gu.	KVA	Make	Type	Ph.	Voltages
2	4200	G.E.	FOVT	3	13500x15700
1	3000	Wagner	HPW-20	3	26400x34400
2	2000	G.E.	HVDIJ	1	6000x13800
3	1000	G.E.	HVDIJ	1	2400x480
6	600	Wagner	OIRC	1	13200x460
3	407	G.E.	HD	1	13800x2300

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No. 12 and 18 Fellows Gear Shaving Machines, m.d., late
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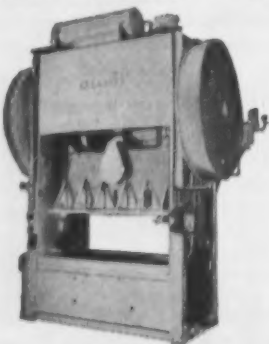
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Mill—Resonditioned

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1—144" x 3/16" Stamco Power Squaring Shear. Manufactured by Streine Tool & Mfg. Co. 1937. Cast steel construction. Knives—146" x 4" x 1". Cap—18". Including spring activated holddown. Spring top knife counterbalance.

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10' vertical mill, max. swing 124", under rail 70", driven by four-speed 40 h.p. 3-60-220 motor, double back-gear rapid traverse.

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2—100 h.p. E & M synchronous, 720 rpm, 220-3-60 cycle, complete controls and 3 KW exciter generators.

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(16)—CO-1822-24-25-26-28-30-32
(19)—MD-101-2-3-4-5-6-8-9
(6 of those are type MD8)
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(37)—HW-7½-10-15-AW-A2W-BW-DW-FW
We also have a large stock of Electric Brakes, Drum type and Magnetic Control Panels.

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Qu.	HP	Make	Type	Volts	R.P.M.
2	3000	Whae.	Rev.	525	600
1	2000	Whae.	Mill	600	230/460
6	1500	Whae.	Rev.	525	600
1	1200	G. E.	M.P.	600	525/700
4	800	Whae.	Rev.	525	600
1	800	Whae.	Mill	300	210/650
5	700	Whae.	Rev.	525	300/700

SPECIAL-DUPLICATE MOTORS

Qu.	HP	Make	Type	Volts	R.P.M.
2	125	Whae.	RK-184	230	575/850
6	100	EL DY.	8-30	230	450/1850
3	75	C.W.	T.E.F.C.	230	840
3	50	Whae.	RE-131.5	230	600/2200
3	25	Whae.	RE-60	230	1800
4	15	Whae.	RE-91	230	550/1000
4	5/7½	Rel.	T.E.F.C.	230	337/1350

TRANSFORMERS

Distribution—Outdoor type—OISC

Qu.	KVA	Make	Phase	Volts
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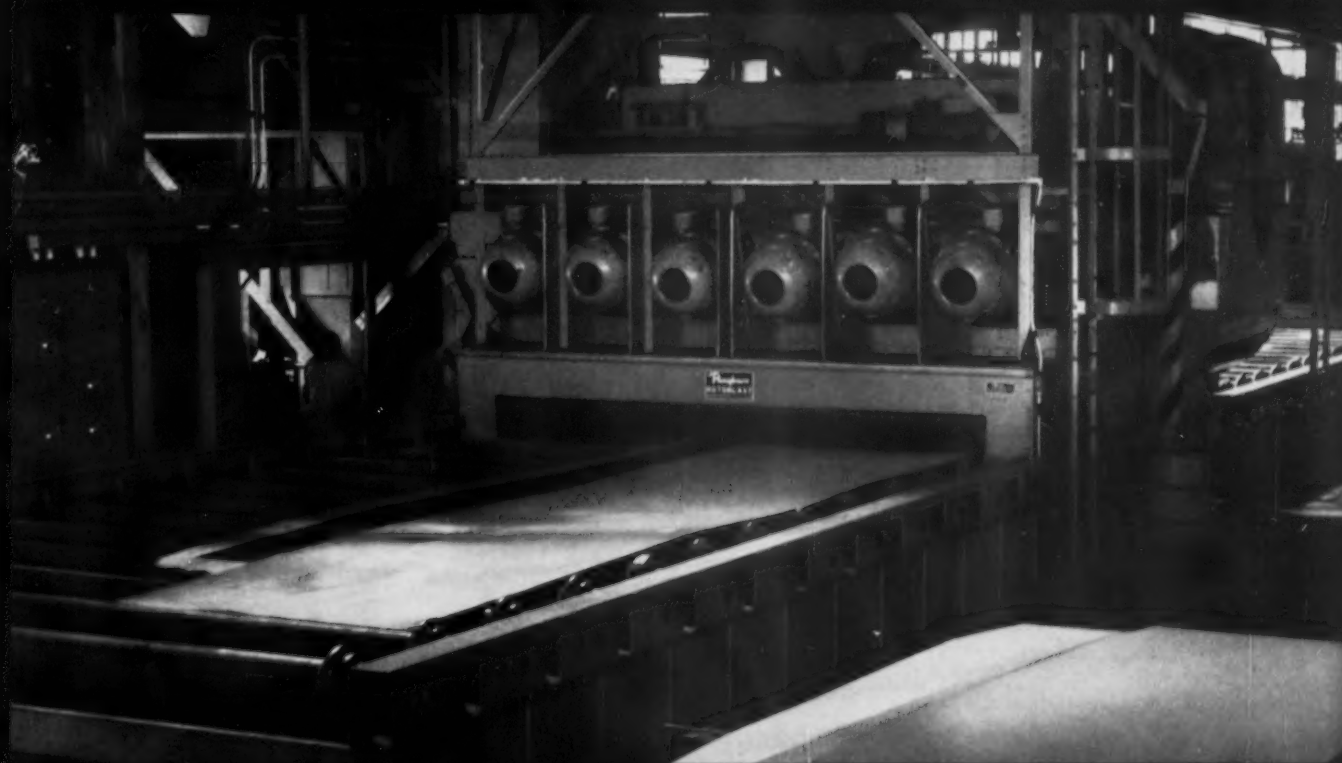
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Descale steel sheets, plates, coils



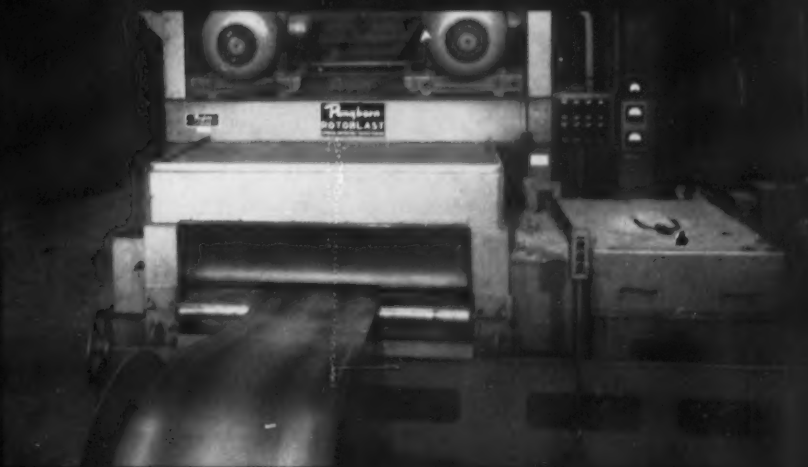
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*U. S. Pat. # 2184926 (other patents pending)

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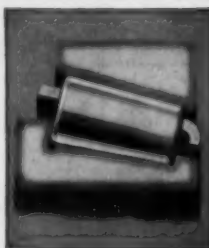
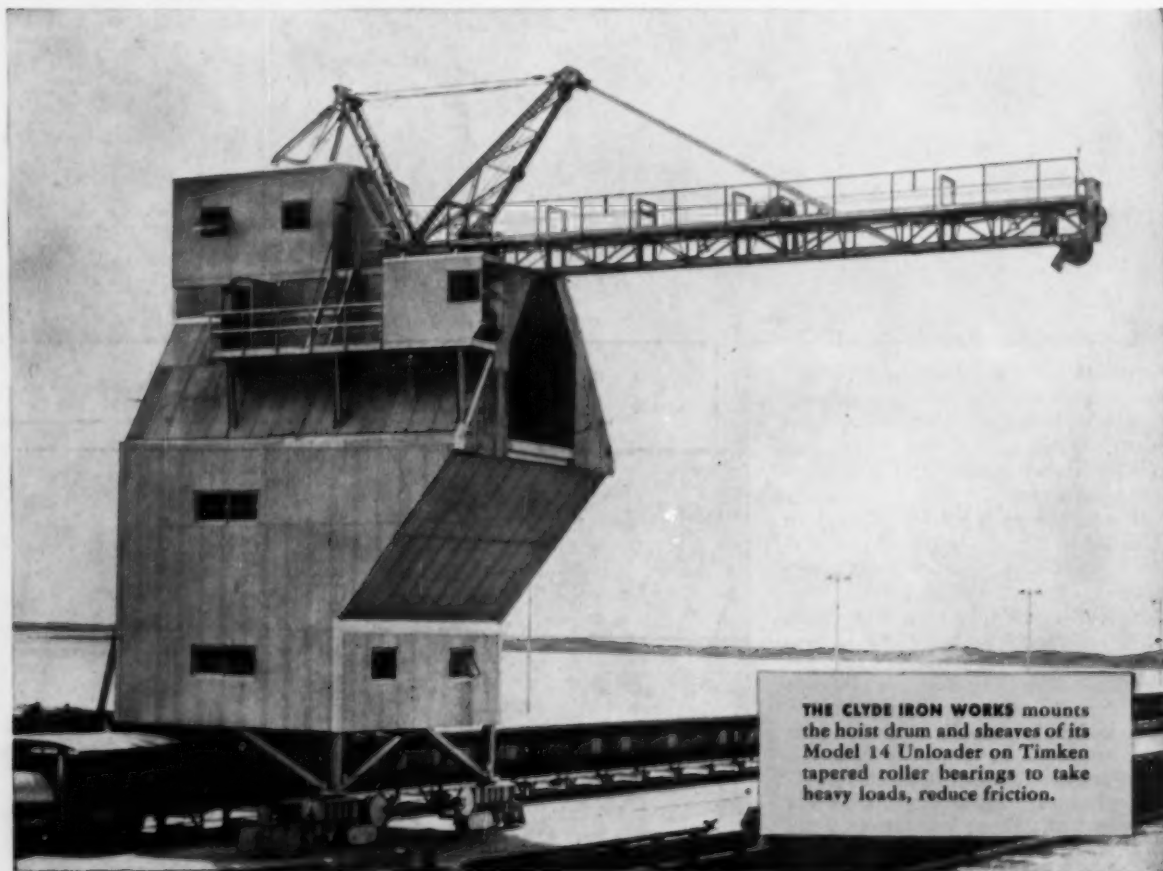
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